INDEX NUMBER

AMERICAN JOURNAL OF ORTHODONTICS

OFFICIAL PUBLICATION OF
THE AMERICAN ASSOCIATION OF ORTHODONTISTS,
ITS COMPONENT SOCIETIES, AND
THE AMERICAN BOARD OF ORTHODONTICS

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Vol. 43 DECEMBER, 1957 No. 12

Whatever Your Needs. . .

1 Williams Round Buccal Tubes — for .036" or .040" diam. wire.

2 Williams No. 2 Arch Wire — for labial or lingual arches. Round (.036" to .040" diam.) or rectangular (.022" x .028").*

3 Williams No. 1 Ortho Wire — for intermaxillary hooks, adjustable spring stops, etc. (.020", .022", .036" or .040" diam. wire).*

4 Williams Anterior Bands — anatomically contoured — 18 graduated sizes, .004" x .160" wide.

5 Williams Open Bracket Tubes — for .032", .036", or .040" diam. wire.

6 Williams Stainless Steel Ligature Wire — .012" diam.

7 Williams Lok-Tite Wire — high bend test rating — .028" and .030" gages.

8 Williams Mershon Tubes and Posts — extra bearing surface for greater stability to lingual arch. (Also round and half-round tubes.*)

9 Williams Seamless Molar Bands — plain or contoured — 24 graduated sizes, .007" thick x .180" wide.

10 Williams Adjustaloop Contoured Bands — precise anatomical conformity — .036" to .485" diams.

11 Williams No. 1 Ortho Spring Wire — for stabilizers, auxiliary springs, etc. — .020" or .022" diam.*

12 Williams Arch Repair Tubes — slotted for quick, simple mending. In 4 sizes.

13 Williams Band Material — gages .009" to .003", widths .12" to .25".*

X Williams Ortho Wire Solder — gages .020" and .012" known for its ease of flow, strength, and absence of pitting.

*Items indicated also available in stainless steel.

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For helpful information on all items write for complete catalog and prices.

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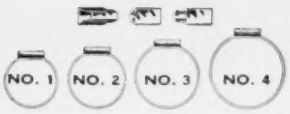

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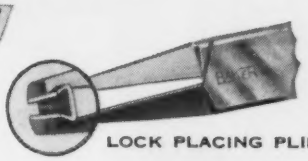
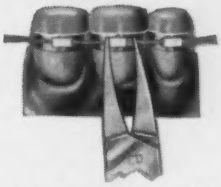


LOCK PLACING PLIERS



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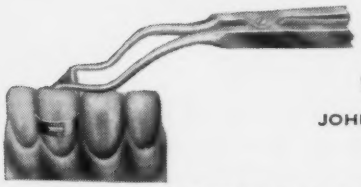

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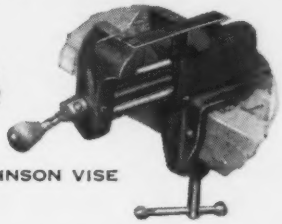

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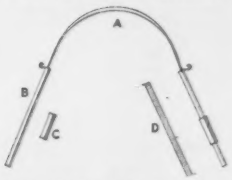
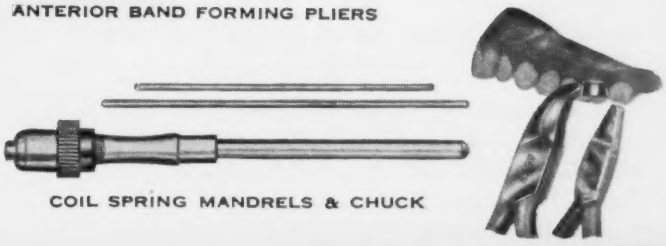


STAINLESS STEEL TWIN WIRE ARCH WITH .023 I. D. .035 O. D. END TUBES ORALIUM MOLAR TUBES ¼" X .036 SPRING STEEL COIL, .009 WIRE



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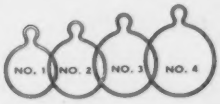

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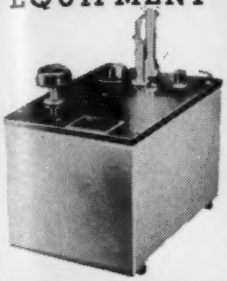

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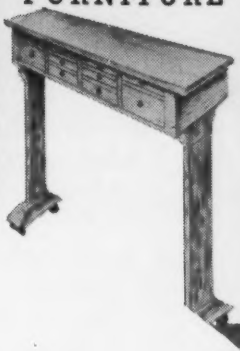

OPERATING AIDS

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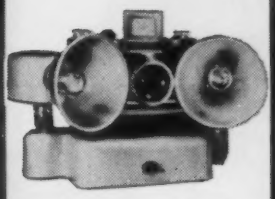

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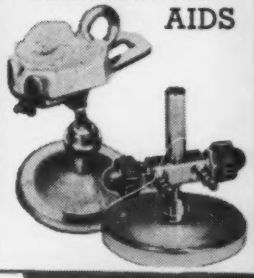

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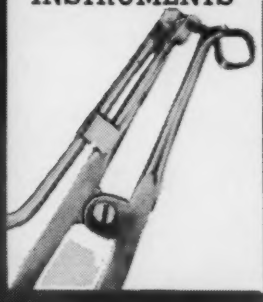

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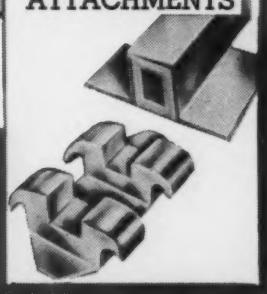
ORTHO WIRES

ATTACHMENTS



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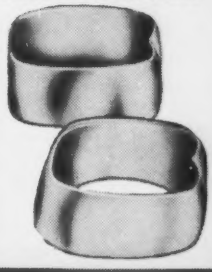

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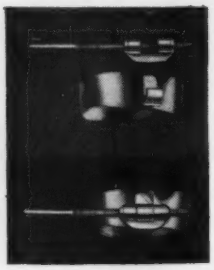

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Makes removal and reinsertion of either lingual or labial arch extremely simple. Permits exact and rapid lengthening or shortening of arch — 1/100 inch per revolution of swivel—without disengaging it from bands on anterior teeth. Allows arch to lie in a straight line at the gingival margins, doing away with vertical bends.

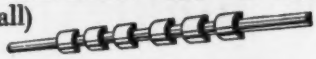
TUBES AND SHAFTING

TUBES — HALF ROUND

DL-8, length .08″; DL-10, length .10″
(Inside dimensions .032″ x .064″; .012″ wall)

DL-10H, length .10″
(Inside dimensions .032″ x .064″; .014 wall, extra heavy)

DS-8, length .08″; DS-10, length .10″
(Inside dimensions .020″ x .040″; .010″ wall)



SHAFTING — HALF ROUND

NEY-ORO ELASTIC #4, special shape to fit DL and DS tubes. PALINEY #7, special shape to fit DL and DS tubes. 3 inches of shafting to 1 dozen tubes is usual proportion.

WIRE SIZES

- Round Arch Wires
  .032″ .036″ .038″ .040″
- Auxilary Springs
  .020″ .022″ .025″
- Ribbon Arch Wires
  .022″ x .028″ .022″ x .036″
- Rectangular Arch Wires
  .022″ x .025″ .022″ x .028″ .022″ x .036″
- Square Arch Wires
  .022″ x .022″ .024″ x .024″

5 dwt. container of solder in wire form. 26 ga. and 28 ga.

SOLDER SHAPES

- Band Solder, .809 fine
  Each piece .20″ x .062 x .0075″.
- Attachment Solder, .560 fine
  Each piece .127″ x .062″ x .0075″.
- Solder Ferrules, .560 fine
  Each piece .032″ inside diam. x .003″ wall.
- Solder Disks, .560 fine.

ROUND TUBES

R-025, length .25″, fits .040 wire
R-125, length .25″, fits .036 wire
R-135, length .35″, fits .036 wire
R-145, length .45″, fits .036 wire
R-220, length .20″, fits .030 wire
R-310, length .10″, fits .025 wire

Wall thickness of all around tubes is .012″.

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.022″ x .028″, 5/16″ long

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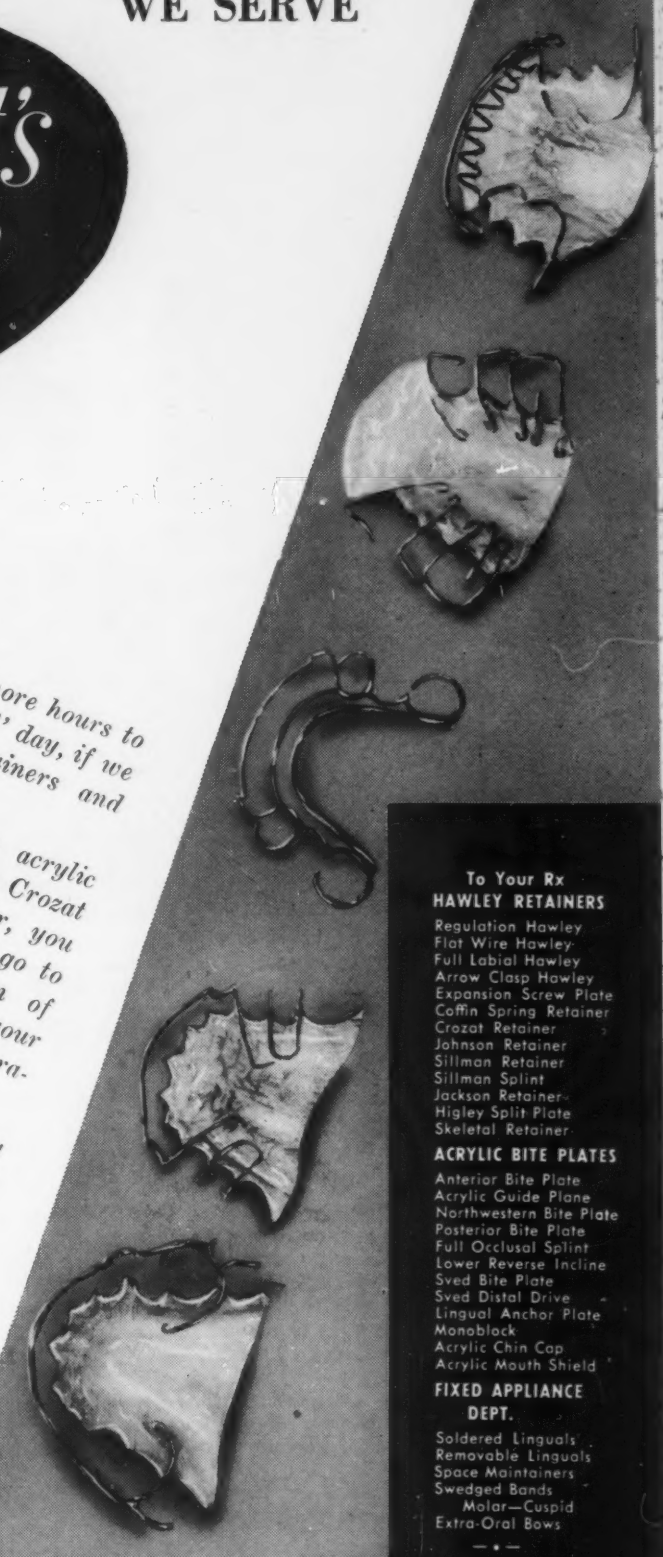

To Your Rx

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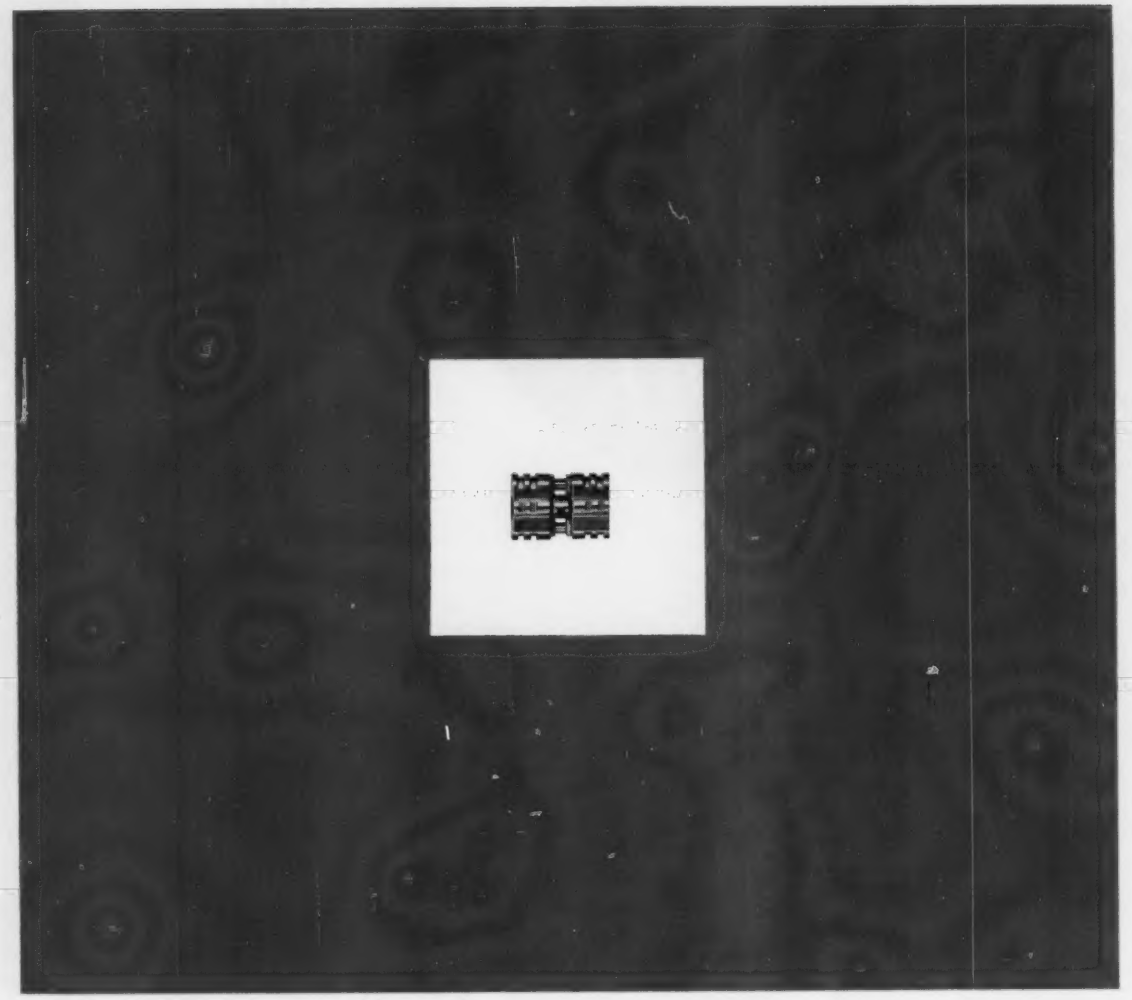


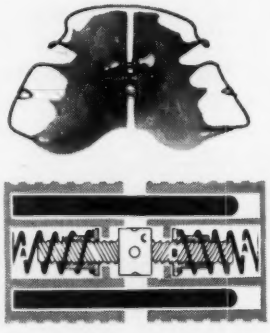
UNIQUE NEW EXPANSION SCREW IS SPRING-ACTIVATED

—provides continuous pressure, precise adjustment
—particularly helpful in cleft-palate cases

Available exclusively from Unitek, this stainless steel expansion screw combines the advantage of accurate adjustment with constant, *spring-applied* pressure on the appliance. Twisting is eliminated—double guide pins insure straight-line movement.

A guard, supplied with the unit, serves as a handle for easy installation and keeps acrylic from getting into moving parts. The guard is easily removed after the appliance is processed.
A separate key, also supplied, quickly adjusts the highly accurate screw mechanism.

Unitek Corporation is exclusive U.S. distributor for this new West German product.



EM 100 Spring Expansion Screw

A. Spring provides constant pressure
B. Screw is adjusted (through hole C) to 0.3 mm per turn, 6.0-mm maximum.
Dimensions (closed): 11 mm long, 10 mm wide, 3 mm thick.

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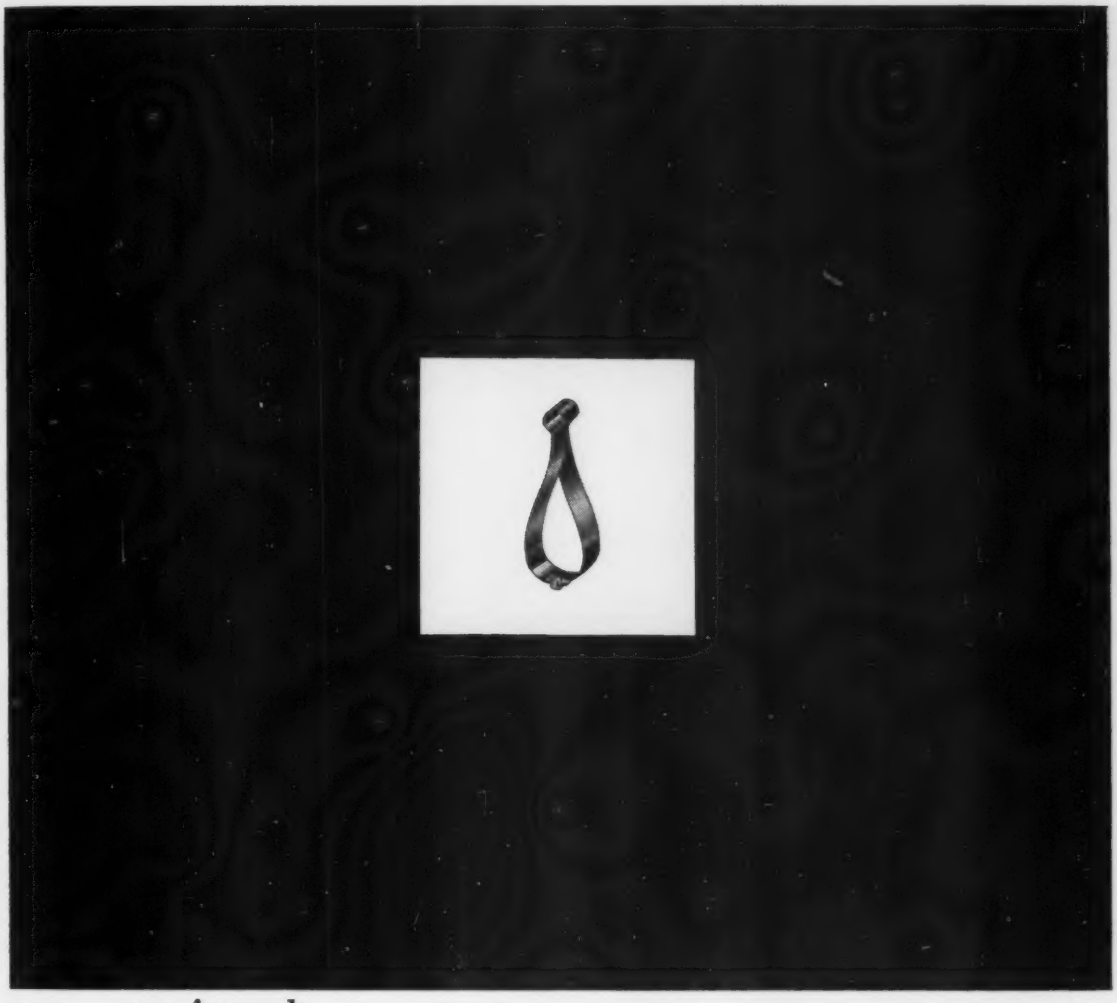

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The man in the wheel chair leaned into the microphone. "Christmas!" he snarled. "Bah! Humbug!" And, as they had in Christmases past, millions of young listeners chilled at the mental picture of the baleful Scrooge.

It was a Christmas institution, back in the Forties, this annual reading of Charles Dickens' classic. Its reader was something of an institution himself. In his turbulent lifetime he had been an unsuccessful painter but a good amateur second-baseman, a composer whose music was played by the New York Philharmonic, and a model for Frederick Remington.

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"Time-Saver Units" are offered in special prewelded assemblies on your favorite Band Material Size. CHROMEX exclusive electronic welding process minimizes human error and assures that assemblies are properly centered on band material.

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Welded to Band Material	2.80	30.50	114.37 (saving $38.13)
GT 2 Posterior Edgewise Brackets	2.30	25.50	95.62 (saving $31.88)
Welded to Band Material	3.30	36.25	135.94 (saving $45.31)
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Welded to Band Material	3.30	36.25	135.94 (saving $45.31)
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Welded to Band Material	3.30	36.25	135.94 (saving $45.31)
GT 5 Narrow Double Edgewise Brackets	2.30	25.50	95.62 (saving $31.88)
Welded to Band Material	3.30	36.25	135.94 (saving $45.31)
GT10 Twin Tie Channel Brackets Size .075 (Narrow)	1.80	19.85	74.44 (saving $24.81)
Welded to Band Material	2.80	30.50	114.37 (saving $38.13)
GT11 Twin Tie Channel Brackets Size .110 (Wide)	1.80	19.85	74.44 (saving $24.81)
Welded to Band Material	2.80	30.50	114.37 (saving $38.13)
GT16 Twin Arch Brackets (flangeless) Welded to Band Material	3.00	33.00	123.75 (saving $41.25)
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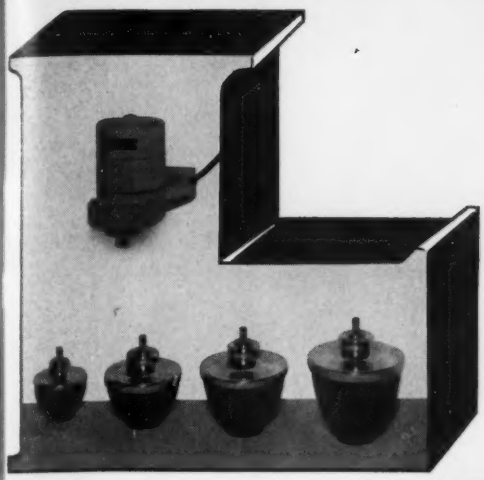

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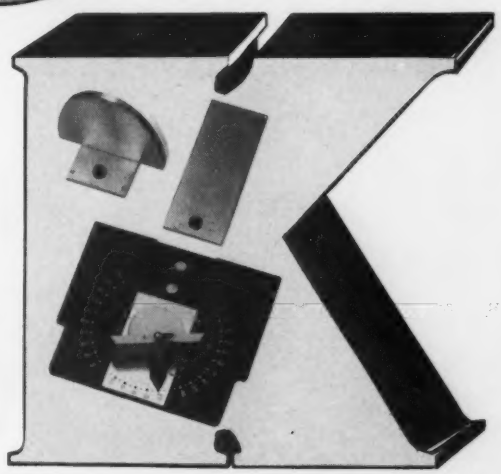

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Original Articles

DISTURBANCES IN THE DEVELOPMENT OF THE UPPER JAW AND THE MIDDLE FACE

GUSTAV KORKHAUS, M.D., D.M.D., BONN, GERMANY

PART II. FUNCTIONAL INFLUENCES

(Continued from the November issue, page 868)

Functional Influences.—Having discussed the definitely pathologic relationships, I shall now pass on to the physiologic development of the middle facial skull and the influence which can arise from functional stresses. In this connection, I should like to remind the reader that the most important centers of growth for the region of the upper jaw are, apart from the synchondroses at the base of the skull which have already been mentioned, the following sutures (Fig. 25): (1) the frontomaxillary suture, (2) the zygomaticomaxillary suture, (3) the zygomaticotemporal suture, and (4) the pterygopalatine suture.

Growth in these sutures, which all lie parallel to each other, causes a movement of the upper jaw region in a downward and forward direction.

It is to be expected that the many functional stresses acting in this region, such as breathing, mastication, speech, and facial expression, exert an important shaping influence. In the case of the inside of the nose, we encounter the far-reaching influence of the functional stimulus emanating from nasal respiration. If, during babyhood and early childhood, there is mouth breathing instead of nasal respiration, it is to be expected that, as a result of the elimination

Read before the Great Lakes Society of Orthodontists, Ottawa, Canada, October, 1956.

of important functional impulses, there will be an inhibition of growth of the inner nose and a decreased pneumatization of the middle face. I am convinced that a critical teleradiographic examination of children with mouth breathing would prove this assumption conclusively.

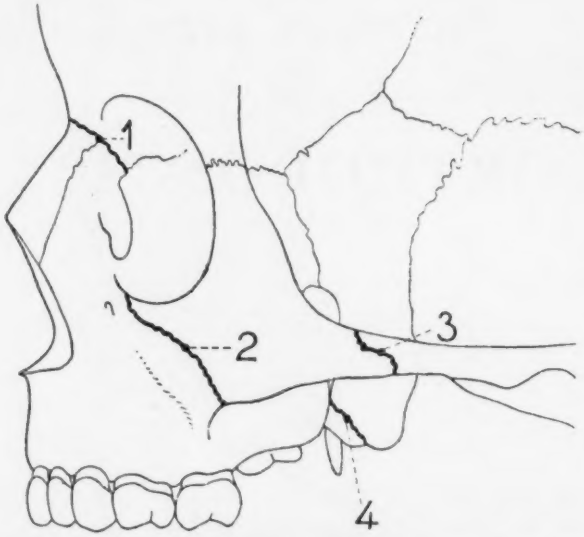


Fig. 25.—The sutures of the middle face which regulate the growth of the upper jaw region. (According to Weinmann and Sicher from Izard.)

The masticatory function also exerts a strong modifying influence on the shaping of the facial skull. A striking example for this is afforded by the 31-year-old mono-ovular twins M. and E. St. The make-up of the facial skulls of these twins gives a rare insight into the results of an abnormal masticatory function despite the presence of identical inheritance factors (Figs. 26, 27, and 28). I had occasion to examine the twins during early childhood and ascertained that at the age of 6 both had the same genuine prenormal occlusion (progenia) in the deciduous dentition. Incidentally, other members of the family also exhibited the same anomaly. In the case of twin E. this prenormal occlusion corrected itself spontaneously during the change of dentition and subsequently a fully harmonious facial skull with normal occlusion developed. Normal incisal overbite and normal inclination of the axes of the upper middle incisors, a normal shape of the base of the upper jaw, a correct ratio between the well-developed rami of the mandible, and a satisfying position of the lips were noted.

In the case of twin M. this favorable development did not take place. The progenia, with its inverted incisal overbite and corresponding abnormal mastication, was transferred to the permanent dentition and a facial skull developed which is typical for true progenia with mesioclusion. There is a pronounced shortening of the base of the upper jaw and of the upper alveolar process, as well as a forward inclination of the upper middle incisors, a flattening of the angle of the mandible, a disturbed ratio of the rami of the mandible, and an esthetically unsatisfactory position of the lips.

The outline tracings (Fig. 28), which have been related to the basal line of De Coster, allow a survey of the differences in the make-up of the facial skulls. They show the complete similarity in the shape of the cerebral skulls.

Fig. 26.—Mono-ovular twins Margarethe and Elisabeth St. (aged 31 years) with different makeup of the facial skull. In the case of Twin I there is progenia, in Twin II there is correct overbite.

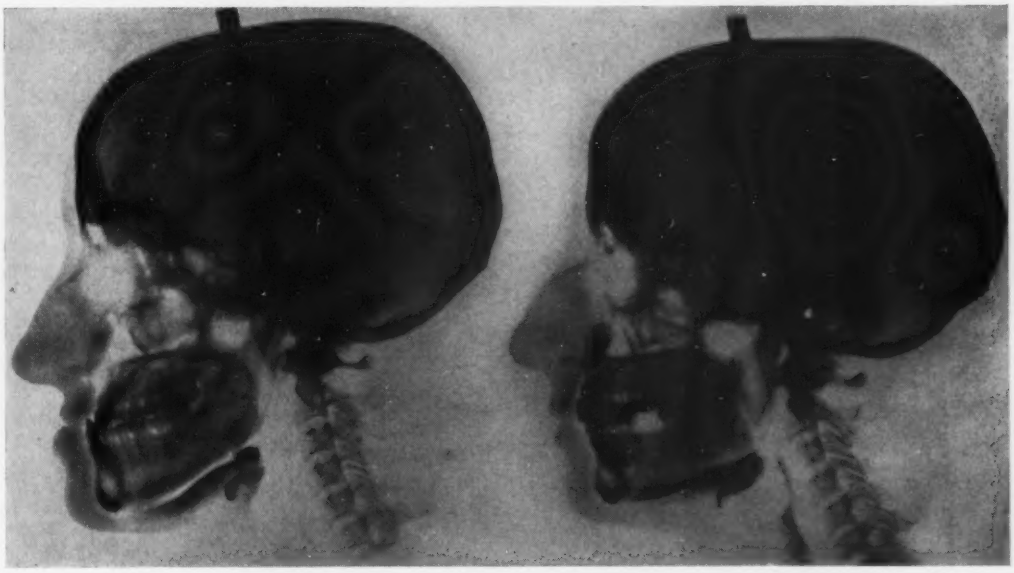


Fig. 27.—Teleradiographs of the mono-ovular twins shown in Fig. 26.

The discussions of the masticatory movements and their inhibiting and stimulating action on the growth of the immediate and surrounding regions brings us to the dentition itself. The next question which arises is: How much can a reduction in the number of teeth, caused by absence of the germs, influence the growth of not only the alveolar processes, but also of the jaws themselves? It is clear that the centers of growth, as such, at the base of the skull and in the various sutures of the middle face, as well as the cartilage of the temporomandibular joints, can hardly be affected by such a reduction in the number

of teeth. In cases of extensive anodontia the elimination of the functional stresses created by mastication undoubtedly has a certain, but limited, influence. The fact that in some cases of total or partial anodontia the mandible nevertheless developed to a remarkable degree, has misled some into altogether negating any influence of the teeth on the growth of the jaw. A detailed examination of such cases by means of teleradiographs shows that this assumption is unjustified.

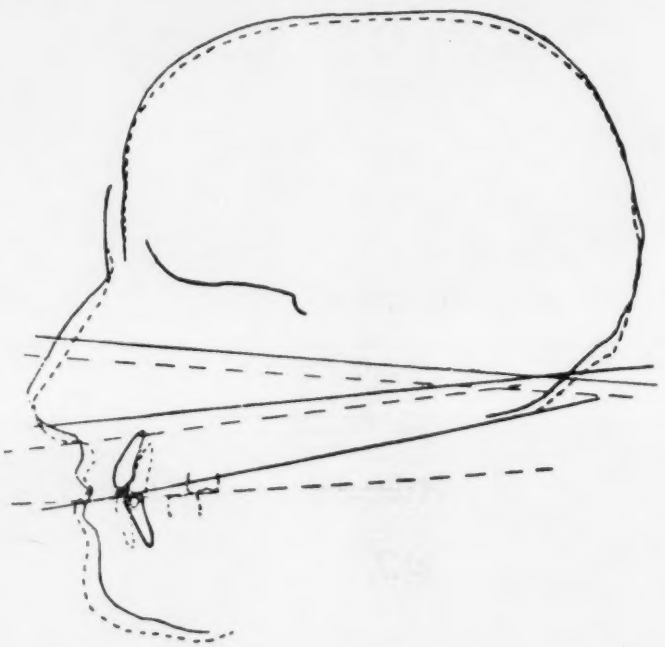


Fig. 28.—Comparison of the outline tracings of the teleradiographs. Great similarity in the shape of the skull but striking differences in the facial skull.

This is especially true for the upper jaw, the base of which can, as is well known, be differentiated only with difficulty from the region of the alveolar process (Figs. 29 and 30). However, even the mandible shows a definite reduction in size in such cases. Even if the growth emanating from the cartilage of the temporomandibular joints proceeds without great disturbance, there is no apposition of bone at the front and on the exterior buccal surfaces of the mandible, which is normally bound up with the development of the alveolar process and of the mesial push of the teeth. The profile of patients with extensive anodontia in both dental arches shows, apart from a negative mouth region, a sunken position of the wings of the nose and a backward position of the subnasale and, therefore, a downward sloping nasal base.

The loss of permanent teeth during the growth of the jaws results in an elimination of the physiologic mesial push of the teeth emanating from the last developing and erupting molars. These extraction results correspond in all respects to the interesting cases of unilateral semiretention of the six-year molar in which cases the extent of the inhibition in growth can be established by

Fig. 30.—Patient Sch. H., 26-year-old uncle of patient in Fig. 29. Extensive anodontia. Only $\overline{|6}$ is present.

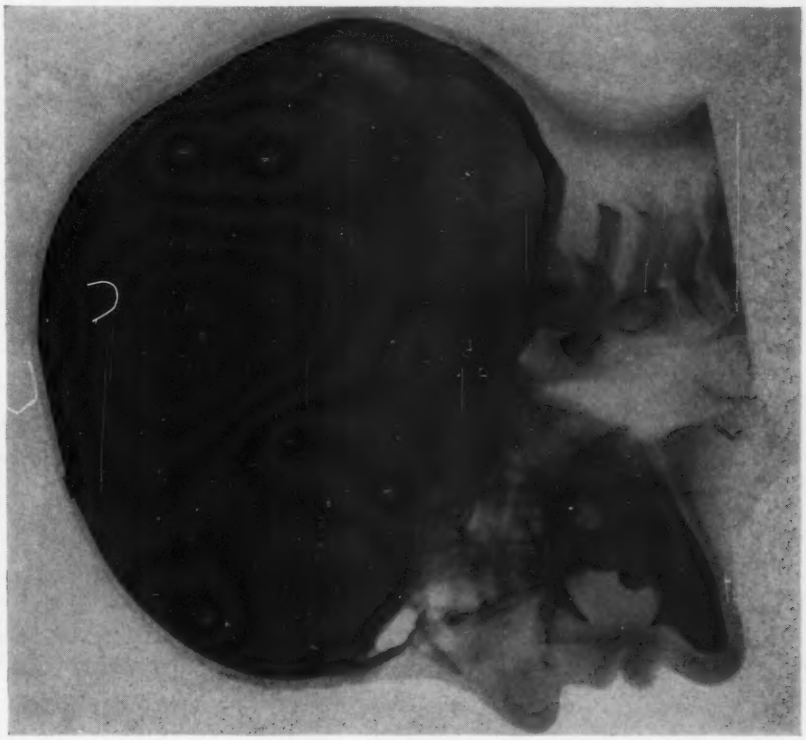


Fig. 29.—Underdevelopment of the middle face and upper jaw and of the lower alveolar process due to extensive inherited anodontia. (Patient H. W., aged 9 years.)

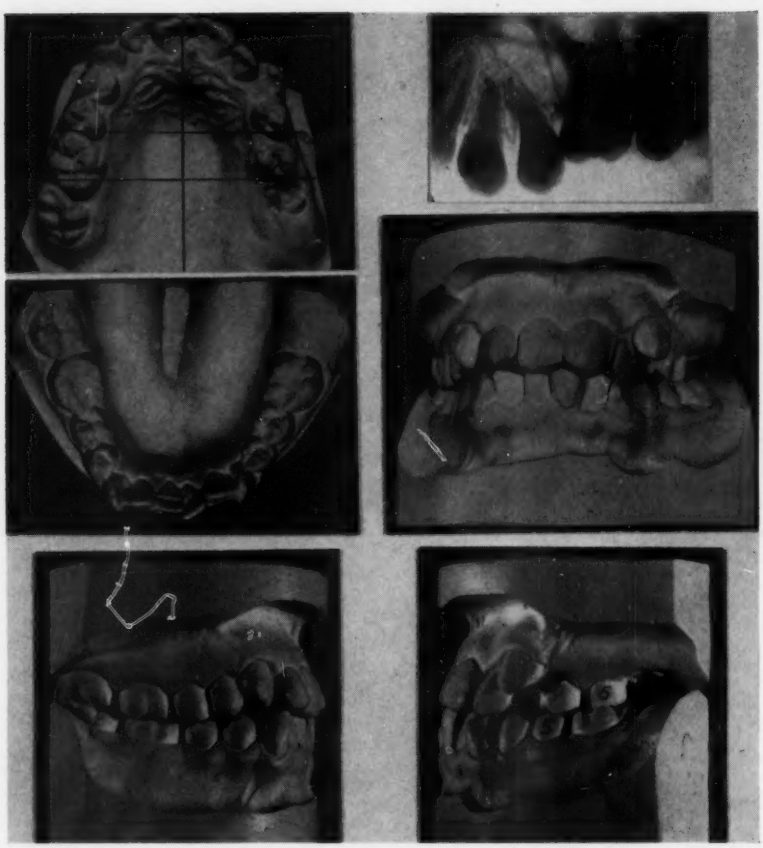


Fig. 31.—Semi-retention of |6 in 16-year-old girl; |7 has not yet erupted. The left upper teeth have remained in a posterior position by 7.5 to 9 mm. Pronounced displacement of the midline. In the radiograph, tipping in a distal direction of |5 and spaced position of |3 4 5 can be clearly recognized. The occlusion also shows striking inhibition of development. |5 occludes in the distal fissure of |6.

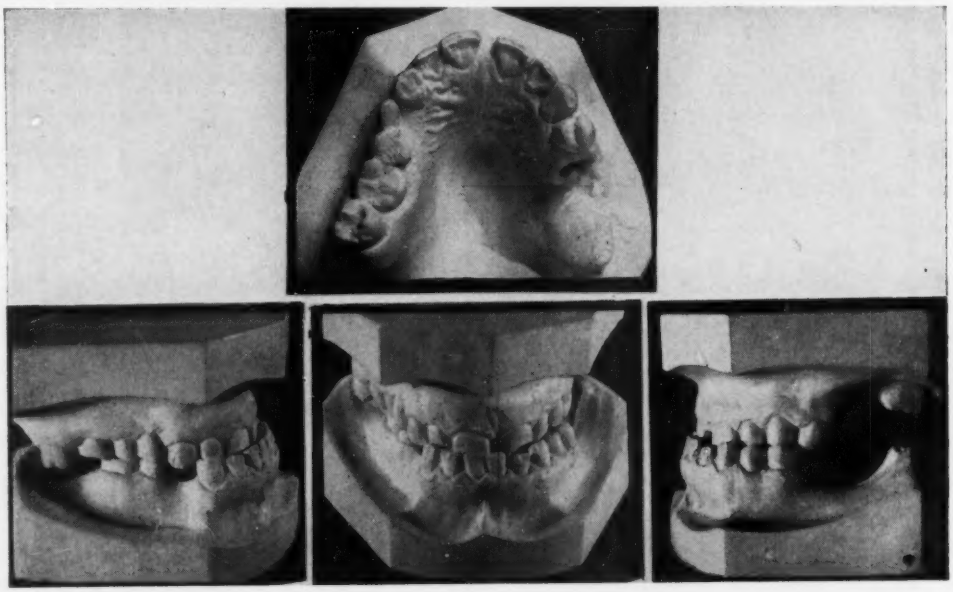


Fig. 32.—Semi-retention of |6 in a 36-year-old female patient St. O. False progenia, left-sided cross-bite, laterally open-bite.

means of the intra- and intermaxillary comparison of symmetry according to age. Striking cases of this type which I published, such as those of a 16-year-old girl (Fig. 31) and a 36-year-old woman (Fig. 32), show pronounced disturbances of development of the upper alveolar process and partly also of the upper jaw. The very reasonable assumption that the surrounding parts of the facial skull are also affected would have to be proved by the critical analysis of teleradiographs of such cases.

The same unfavorable influence which is exerted by the absence of teeth and the premature loss of teeth during the development of the jaws is also exerted in cases of loss of teeth and tooth germs due to childhood osteomyelitis. In the past the speedy and dangerous development of this necrotic osteomyelitis made it necessary, especially in the upper jaw where the position of the dental germs allows infections to spread easily, to remove all germs affected by the inflammation so that in the end the permanent loss of the dental germs of the whole side of a jaw resulted.

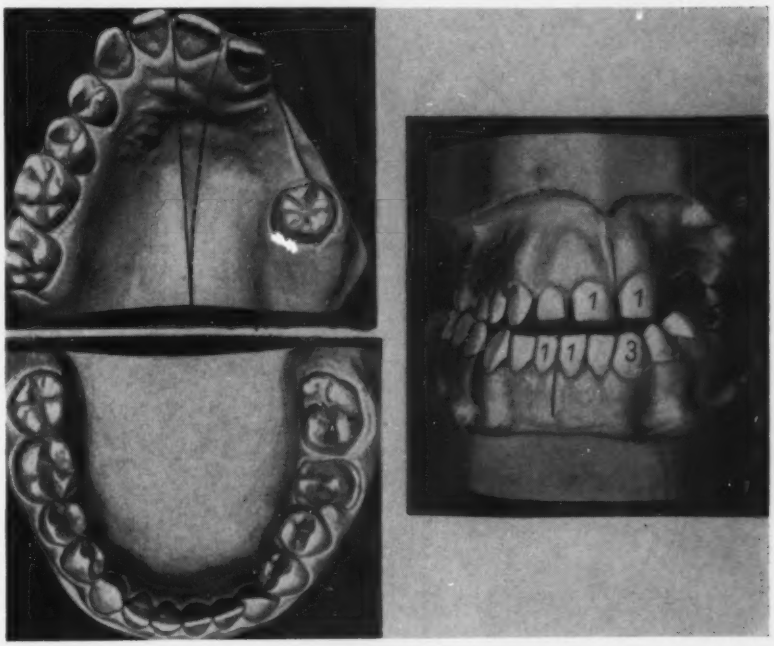


Fig. 33.—Patient G. E., an 18-year-old girl. High-grade disturbances of development on the left side of the upper jaw due to childhood osteomyelitis at age 1½. On this side only $\underline{|1}$ and $\underline{|8}$ have remained. Note extraordinary displacement of the upper midline. Progene retrusion of the upper incisors, left-sided cross-bite, and open-bite.

A very interesting case of this type which I was able to observe was that of an 18-year-old female patient. As the result of an osteomyelitis at the age of 1½ years, the germs of the permanent teeth, from the lateral incisor to the second molar in the left upper jaw, were lost (Fig. 33). The photographs of the models, from above and in occlusion, show the extraordinary inhibition of growth in a sagittal, transverse, and vertical direction, which was caused by

the premature loss of this large number of teeth. It can be assumed with certainty that in this case the body of the upper jaw was affected as well; unfortunately, I can show no teleradiograph of this case which was observed many decades ago.

After having discussed an orthodontic anomaly like the genuine open-bite which results chiefly from an inhibition of growth due to vitamin D deficiency, I should now like to mention the genuine progenia (Class III, Angle). Even if, as is indicated by the name, the special characteristics of this anomaly are a forward position of the chin and an overdevelopment of the corpus mandibulae, this is accompanied in most cases by an underdevelopment and backward position of the upper jaw and the entire middle face.

It would be worth while to examine very thoroughly whether this inhibition of development of the middle face is primary or is a secondary characteristic due to the prenormal articulation and abnormal masticatory function, as was demonstrated above in the case of the mono-ovular twins M. and E. St.

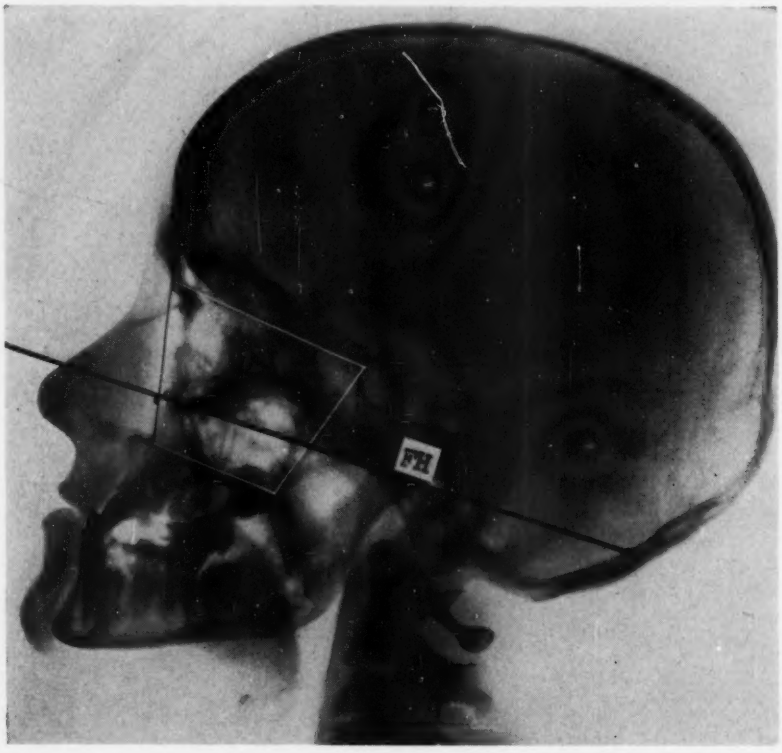


Fig. 34.—True progenia (Class III, Angle). Patient G. H.-H. approximate'y 9 years old. Line *FH* represents horizontal position of head.

Many examples of genuine progenia with hypoplasia of the middle face can be observed in daily practice; two of these cases may be demonstrated (Figs. 34 and 35). The fact that such an underdevelopment of the middle face is found with great frequency, especially in early forms of progenia in the deciduous dentition, arouses the suspicion that in the origin of some cases of

progenia inhibition of growth in the synchondroses at the base of the skull and in the sutures of the middle face plays an important and perhaps even a primary part. In this connection, the fact that the genuine progenia is a dominantly inherited characteristic by no means contradicts this assumption, if we think of the many hereditary disturbances in the development of the

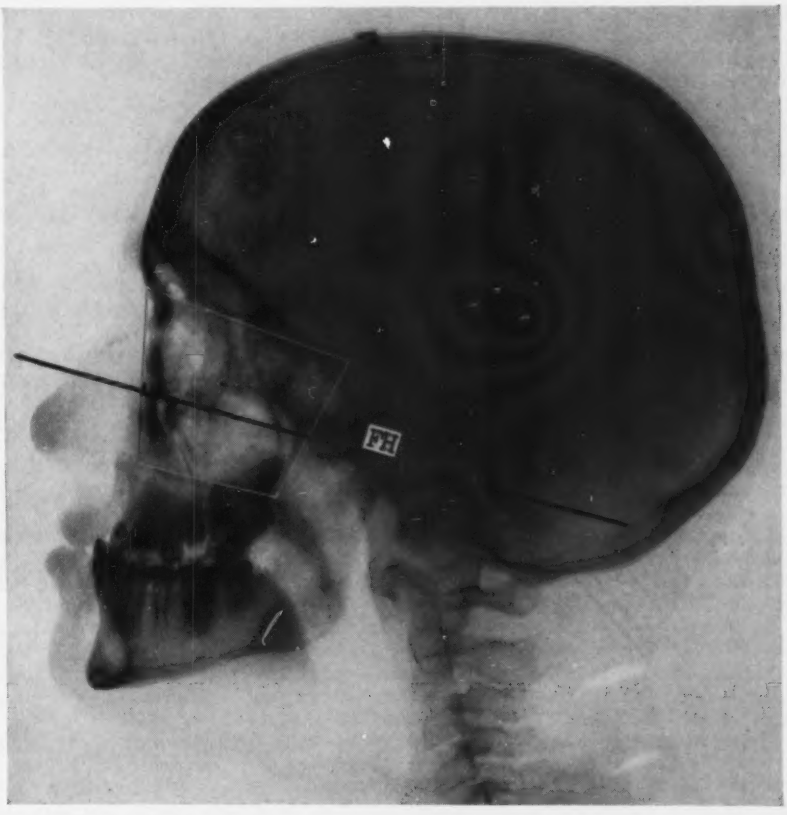


Fig. 35.—True progenia in Patient Sch. D., aged 12 years. Line *FH* represents horizontal position of head.

skeleton which I have mentioned previously as examples. The excessively large tongue which is found so frequently in cases of genuine progenia fully explains the simultaneous excessive growth of the corpus mandibulae. Food for thought is created when one observes that the genuine progenia has several characteristics in common with malformations of the skull caused by inheritance or disturbances of the endocrine system.

The careful and critical analysis, by means of teleradiographs, of the make-up of the facial skull of members of families in which progenia occurs frequently should lead to a further welcome clarification. However, it can be stated that *the disturbances in the development of the upper jaw and the middle face are just as reliable a characteristic of true progenia as the excessive growth and alteration in the shape of the mandible.*

REFERENCES

1. Bauer, K. H.: Konstitutions- und Individual pathologie der Stützgewebe. In Brugsch-Levy: Biologie der Person, Berlin, 1930, Urban & Schwarzenberg, vol. 3.
2. Baume, Louis J.: Provocation expérimentale de distocclusion et brachycéphalie chez le rat par voie endicrinienne, Schweiz. Monatsschr. **66**: 369, 1956.
3. Björk, Arne: Cranial Base Development, AM. J. ORTHODONTICS **41**: 198, 1955.
4. Brodie, Allan G., Jr.: The Behavior of the Cranial Base and Its Components as Revealed by Serial Cephalometric Roentgenograms, Angle Orthodontist **25**: 148, 1955.
5. Fischel, Alfred: Lehrbuch der Entwicklungsgeschichte des Menschen, Berlin, 1929, Julius Springer.
6. Gosman, S. D.: Facial Development in Mongolism, AM. J. ORTHODONTICS **37**: 332, 1951.
7. Von Bergmann, G., Frey, W., and Schwiegk, H. (Editors): Handbuch der Inneren Medizin, Band 6, Teil l, Berlin, 1954, Springer-Verlag.
8. Jensch, N.: Zur Genealogie und Klinik des Turmschädels, Arch. f. Psychiat. **114**: 444, 1942.
9. Keibel, F., and Mall, F. P.: Handbuch der Entwicklungsgeschichte des Menschen, Leipzig, 1910, S. Hirzel, vols. I and II.
10. Klatt, B.: Über Fütterungsversuche an Tritonen, Zool. Auzeiger. (Supp.), vol. I, 1925.
11. Klatt, B.: Kreuzungen an extremen Rassetypen des Hundes, Ztschr. f. menschl. Vererb.- u. Konstitutionslehre **27**: 283, 1943.
12. Korkhaus, Gustav: Gebiss-, Kiefer- und Gesichtsorthopädie. Handbuch der Zahnheilkunde, Band 4, herausgegeben von Christian Bruhn, München, 1939, J. F. Bergmann.
13. Krohn, E.: Fütterungsversuche an Tritonen, Arch. f. Entwcklngsmechn. d. Organ. **121**: 545, 1930.
14. Kummer, B.: Untersuchungen über die ontogenetische Entwicklung des menschlichen Schädelbasiswinkels, Ztschr. f. Morphol. u. Anthropol. **43**: 331, 1951.
15. Leroi-Gourhan, A.: Influence de la denture sur la face osseuse et la base du crâne, Revue franç. Odonto-Stomatol. **1**: 47, 1954.
16. Moss, Malvin L., and Greenberg, S. N.: Postnatal Growth of the Human Skull Base, Angle Orthodontist **25**: 77, 1955.
17. Maronneaud, P. L.: Céphalogénèse et "ligne de référence," Cahiers Odonto-Stomatol. **6**: 17, 1956.
18. Pankow, Gisela: Untersuchung über die Schädelbasisknickung beim Menschen, Ztschr. menschl. Vererb.- u. Konstitutionslehre **29**: 69, 1949.
19. Pankow, Gisela: Indexformel zur Darstellung von Wachstumsstörungen der Schädelbasis und des Mittelgesichts, Ztschr. menschl. Vererb.- u. Konstitutionslehre **33**: 10, 1955.
20. Peter, K., Wetzel, G., and Heiderich, F.: Handbuch der Anatomie des Kindes, München, 1938, J. F. Bergmann.
21. Polensky, R.: Ein Versuch, auf histologischem Wege die Verbildung des rachitischen Rattenschädels zu erklären und Beziehungen zur Difformität des menschlichen Oberkiefers zu finden, Diss. Greifswald 1933.
22. Schulz, M.: Makroskopische Untersuchungen an Schädeln, besonders der Kiefer rachitischer Ratten und ihre Nutzanwendung auf die menschliche Kieferpathologie, Deutsche Monatsschr. Zahnh. **51**: 1005, 1933.
23. Starck, Dietrich: Formwandel des Säugerschädels, Morphol. Jahrb. **79**: 358, 1937.
24. Stelzner, Fr.: Über Entwicklungsstörungen bei Turmschädeln und ihre praktische Bedeutung, Arch. klin. Chir. **263**: 523, 1954.
25. Stockard, Charles R.: The Genetic and Endocrinic Basis for Differences in Form and Behavior, Philadelphia, 1941, The Wistar Institute of Anatomy and Biology.
26. Switzer, C. H.: Een geval van dysostosis craniofacialis, Tijdschr. Tandheelkunde **10**: 691, 1955.
27. Weidenreich, Franz: Apes, Giants and Man, Chicago, 1946, University of Chicago Press.
28. Weinmann, Joseph P., and Sicher, Harry: Bone and Bones, St. Louis, 1947, The C. V. Mosby Company.

A CRITICAL ANALYSIS OF ORTHODONTIC CONCEPTS AND OBJECTIVES

WILLIAM L. WILSON, D.M.D., BOSTON, MASS.

AMONG the many definitions of orthodontic objectives, perhaps the most succinct and lucid is that of Jackson,[1] who lists the triad of "structural balance, functional efficiency, and esthetic harmony." Although this is definitive, it is obvious that it means different things to different persons, so much so that large segments of the orthodontic profession, if presented with a single case, would start out in different directions toward different objectives by different orthodontic means. The last should matter little except that orthodontists, being committed to certain appliances with their inherent limitations, are not free to be objective about their objectives. Concepts and standards have been devised which are subservient to appliance limitations. These concepts and resultant orthodontic objectives are as different as black and white.

The orthodontic profession today is a heterogeneous mixture of groups who have little in common except the orthodontic problem to be resolved. Unless this trend is shortly reversed, we are in no little danger of losing our identity as a homogenous profession. Our hope lies in finding common ground on which we can meet to embrace reasonable objectives and common standards and agree to judge them solely by their workability. There are some basic issues which cloud this common ground and, with my limited ability, it is my purpose to face them openly and squarely, letting the chips fall where they may. The first such issue is our orthodontic interpretation of what is meant by *esthetic harmony.*

In recent years, there has been an attempt to set up facial standards. We have commonly seen the profile of Apollo or other examples of traditional Grecian sculpture used as standards, and these have been held forth as goals in orthodontic treatment. I would like to analyze this practice with you.

Apollo Belvedere is typical of traditional Greek sculpture of the third to the first centuries B.C. Whereas much earlier sculpture carried with it the impression that bodies were cut out of squares or cubes, the Greeks made tremendous strides in the direction of developing classical beauty of body form. There was, however, one distinct area in which they failed to achieve high standards—the area of the head.

Presented before the Northeastern Society of Orthodontists at the Hotel Commodore, New York, N. Y., March 5, 1957.

There were several fundamental errors in Greek heads,[2] and it is interesting that these errors were repeated over and over again. Rarely did the Greeks ever depart from the established traditional facial form during this period (Fig. 1, *A* and *B*). These errors were:

1. A retrusion of the lower third of the face, with the lips falling within the line extended from the tip of the chin to the attachment of the nose and upper lip.

2. The traditional nose; in profile, the nose being carried in a straight line from the forehead to the tip.

3. A squaring of the lower third, resulting from the misplacement of the sculptural turning surface to a line running from the zygoma to the lateral border of the mandible instead of to the chin.

4. The line of the cheekbone, instead of being carried obliquely back to the widest point just in front of the ear, was carried straight back, making the sides almost parallel and narrowing the structure of the face.

5. The tendency to produce time after time perfect symmetry so that a midline drawn down through the face would permit one side to be superimposed on the other with almost exact precision.

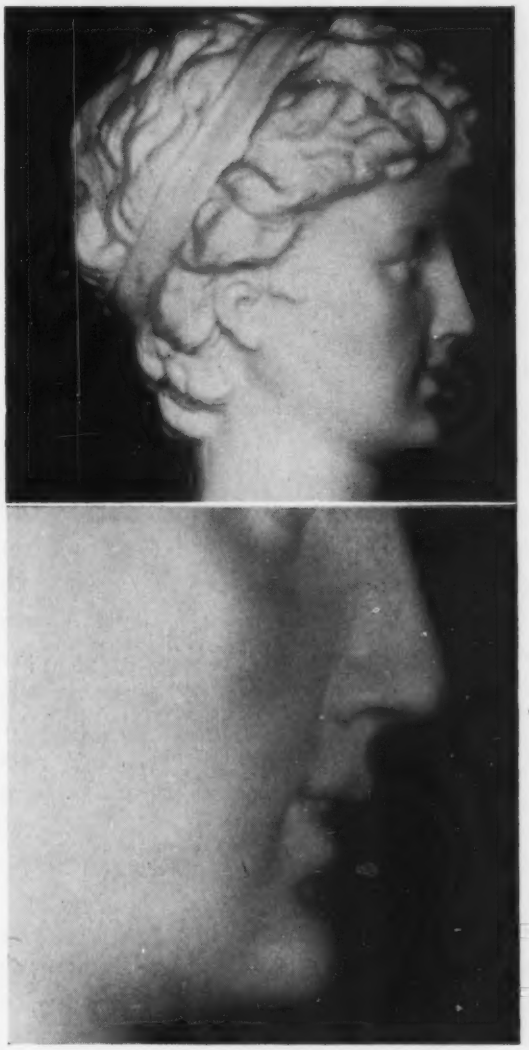
In his sculpture, the Greek was keeping to his inheritance of schematic forms set for the eyes, nose, mouth, etc. The early Greek sculptor "did not hold that he was merely copying an individual human being, he was constructing on a basis of natural appearances a series of surfaces, shapes and lines which the eye could contemplate with satisfaction and the mind consider with approval."[3] The history of Greek sculpture[4] reveals many attempts at producing the head of the god Apollo. Among the more famous are the Strangford Apollo of the sixth century and the Marble Apollo of the Temple of Zeus, 460 B.C., which incidentally has a full mouth and lips. This was a far cry from Apollo Belvedere, which followed in the decadent period of the second century, with the lower third of his face retruded.

One may wonder why the Greeks continued to observe that traditional facial form and rarely departed from it. There might have been some traditional pressures responsible for this. We do know that, except for two short periods during 5,000 years of Egyptian history, sculptural practices were very closely controlled by the prevailing religions of the time. It is conceivable that such also might have been true in Greece. There might have been pressures of some other sort, or the failure to depart from tradition might have resulted merely from the willingness of pupils to follow blindly the dictates and traditions of their leaders. This is a practice not necessarily confined to the Grecian era.

In the first century A.D. many Greek sculptors migrated to Rome and there, with their acquired skills, freed from their traditional concepts and enriched by their new experiences, finally began to produce truly realistic heads. Each of the fundamental errors, including the retruded lower third

of the face, was corrected. Faces were no longer stamped from a mold. Facial asymmetries and irregularities began to appear and sculpture at last began to create true reproductions of the human face. These were far different from the earlier Grecian standards that we have been asked to accept.

A.



B.

Fig. 1.

The principal area of interest to us is that area of the lower third of the face. For those interested in a more recent interpretation and evaluation of human faces and heads, I would suggest an analysis of *The Races of Mankind* by Dr. Henry Field,[5] formerly Curator of Physical Anthropology at the Chicago Museum of Natural History. Dr. Field's study shows seventy-six faces, none of which can qualify by Apollo Belvedere standards or by those standards which we are asked to accept, with the possible exception of a Kashmiri

man from Northwest India. A random sampling of populations, or indeed of those attending this meeting, would show little evidence of a retruded lower third of the face. The sole exceptions are an occasional normal retruded denture-base relationship, those with congenitally missing teeth, and perchance those who have had some teeth extracted in orthodontic treatment. In no sense, however, can these be considered representative of an average or mean of facial forms.

There is a second inadvertent distortion of facts in the use and presentation of profile photographs, however well oriented. Indeed, profile and full-face photographs are the only visual means at our disposal in orthodontic literature and, as such, they are of value. However, their common usage has caused them to be accepted as being the true facial picture when, indeed, they are not. The full-face photograph reveals little other than an evaluation of facial symmetry. The profile, while more indicative in orthodontic evaluation, is nonetheless woefully deficient. It reveals little more than the outline of the median sagittal plane.

The human face comprises countless contours and configurations which do not show in the profile photograph. That this is an understatement might well be recognized by those who have attempted face modeling or head sculpture. An example of this is a Class I patient with high buccal canines. Facial values here are lost in the profile and full-face photographs, as the third dimension is lost in the plane of the photograph. Profile and full-face before- and after-treatment photographs may reveal no comparative difference, and yet considerable facial change has occurred. In certain extraction cases where the incisors are retained in position, as the canine is retracted and carried distally there is a reduction of the canine alveolar eminence with significant facial loss superior to the lateral borders of the lips. Facial quality changes here may be both undesirable and considerable, and yet not revealed in the profile photograph. Hence, if we continue to use the photograph, let us do so with a full awareness that for revealing a true picture of the face it represents something less than half truths.

There is another common error, the practice of using the profile of an adult face as a standard in analyzing the child. Frequently, as growth progresses there is an apparent readjustment of factors and what appears to be a slight mouth fullness at one age may develop, a few years later, into a perfectly acceptable facial balance. Someone has said that the thick-lipped child may develop and become a thin-lipped banker. These changes, although common, might seem paradoxical until one analyzes the underlying contributing factors.

A child develops from a low, broad, retruded face to a high, narrow, protruded one and some gradients of growth change are noted in the middle and late teens. His face musculature is changing from early flabbiness to increased tone, and later in life to a degree of atrophy. His skin undergoes changes from the thickness of childhood to the drying thinness of adulthood. The sum total and interaction of these nonrelated factors produce changing

values in facial form within the limits of the individual pattern. This is something that every vigilant orthodontist must come to recognize. Too, he must anticipate the muscular changes, the thinning, and the dropping-in of the corner of the lips in his attempt to assay the developmental directions in the child (Figs. 2, *A* and *B*, and 3, *A*, *B*, and *C*). He must recognize that the dentures are but one of many factors contributing to the face. An excellent dentofacial skeletal relationship can be distorted by the mere variation of the chin from excessive to median to deficiency (Fig. 4, *A*). This may be compounded by excessive or deficient nose length or variation in lip-nose attachment. Variations in lip length, thickness, and tone are constant factors to be evaluated.

A.

B.

Fig. 2.—*A*, Photograph of patient at the age of 13 years, following orthodontic treatment. *B*, Natural facial changes that have occurred in the patient by the age of 17 years.

I believe that there is unanimity of thought regarding the beneficial facial effects resulting from Class II and Class III treatment and from the lengthening of the lower third vertical dimension in Class II and close-bite cases. No attempt will be made to develop these areas.

Fig. 3.—*A*, Pretreatment photograph of patient at age 13. *B*, Patient at the age of 15 years, at conclusion of orthodontic treatment. *C*, Posttreatment changes at age 17.

Fig. 4.

In orthodontic diagnosis of cases with excessive mouth fullness, after due consideration of the contiguous skeletal factors and evaluation of the age level and dynamics of the surrounding musculature, consideration should be given to the denture retraction by orthodontic means (Fig. 4, *B*).

Considering the other extreme in a distinctly small percentage of cases, one may find a budding Apollo with the lower third of the face retruded. Orthodontic intervention with the anticipation of moving the denture bases forward is, indeed, futile. This is not to be confused with Class II problems.

The core of our problem is the role played by the dentition as a contributing factor in facial form. The excessive fullness of the lips (Fig. 4, *C*) produced by procumbent teeth resulting from excessive arch expansion stands condemned. This practice has produced a reaction among thinking orthodontists. The excessive retrusions (Fig. 4, *D*) resulting from ill-advised orthodontic extraction practices are now being brought sharply into focus. The term *dished-in face* is now commonplace; these facial mutilations are even more reprehensible than the procumbent type, as they are not orthodontically reversible.

A considerable element of the profession is gravitating somewhere between the straight-line and the Apollo concept of profile. Indeed, the straight-line profile (Fig. 4, *E*) is normal for some children and must be accepted, although natural changes in later years will, in all probability, leave the person with something less than a straight-line profile. Percentagewise, a larger number of children have something more than a straight-line profile. The natural fullness of the mouth and lips in repose (Fig. 4, *F*) is an indispensable quality to facial beauty. True, it tends to diminish with age and, as a result, we find the whole cosmetic industry intent upon retaining at public demand the embellished beauty of this area. The glorification of Nature's endowment of natural fullness to lips may be out of reason in its degree but we cannot challenge, we must accept, these facts as well as the more objective critical assay of the matter by sculptural standards. Since the first century B.C. no one, except a handful of orthodontists in recent years, has seen fit to deny this fact.

This should prompt orthodontists to re-examine their concepts. If a pleasing face is to be the goal, then let us accept standards that will be pleasing to our patients, recognizing the natural facial changes in posttreatment years. Let us refrain from trying to superimpose types of faces on patients as if they were stamped from the mold. This has resulted, in part, from an attempt to conform the denture to the facial bone according to a preconceived cephalometric analysis. However much the analyst would like to believe his methods valid, they can never be used as a sole criterion because of the integration of other factors—osseous, cartilaginous, and muscular. The sculptor Albrecht Dürer of Nuremberg, Germany, was "obsessed to discover the underlying geometric and numerical necessity in the beauty of human form and he almost succeeded but finally found that standards were something from which to deviate and not toward which to strive. He concluded that the beauty of

living things seems to involve a host of minute departures from an underlying geometric uniformity."[3] We must recognize that perfectly satisfactory dentures and faces may fail to conform to preconceived statistical norms. How, then, must we regard profiles? Certainly the multiplicity of factors predicates against any standardization, geometric or otherwise. This fact may be a source of disappointment to some who feel the need of such a crutch.

It is incumbent upon each orthodontist to dismiss the concept of a norm for a standard and to develop for himself an awareness of the range of variability with regard to profiles from random sampling experience with untreated faces. To do this, one must recognize that a mean, not a normal, exists and that, where the variation from the mean is not great, the orthodontic treatment should not be predicated upon any basic change. Certainly, it must never be away from the mean and toward the extremes. Where the variation from the mean is great, the consideration of basic change should be toward the mean, but no further. This must be evaluated in terms of the possibility of establishing occlusal balance. This is not to be confused with the desirability of uprighting incisors having either a lingual or a labial inclination. Such corrections, with few exceptions, do reflect favorably on the profile.

If we are to view faces objectively, we must recognize the infinite variation of racial, familial, and individual form, and realize that perfectly normal stable dental occlusions may be found in a wide variation of such faces. When we study faces, we must see what we see and not what we are led to believe that we must see. We must avoid producing excessive protrusions or retrusions. If we are to expand arches or extract teeth in our treatment, we must make such decisions in terms of the relative degree and stability of the projected dental results, with the profile an important but secondary factor.

Most of the issues that divide us pertain to our interpretation of *structural balance* and *functional efficiency*. Our evaluation of orthodontic objectives here must not be unilateral, but rather contingent upon more comprehensive considerations. Dentistry has, for its prime objective, the maintenance of longevity of teeth. Orthodontics concerns itself more specifically with the component of occlusion as it pertains to the problem.

It is commonly recognized that as many teeth are lost for periodontal reasons as for carious reasons. Operative in the periodontal problem is the continued presence of constitutional factors which either limit or enhance the effect of the local factors. Chief among these latter is the occlusal component. Variations in malocclusions produce varying degrees of effects:

1. Small spaces between individual teeth are more damaging than larger ones. These encourage the impaction and retention of food with subsequent impingement on the gingiva, producing a pressure resorption of the alveolus.

2. Overlapping of teeth permits retention of food particles against the gingiva, producing irritation.

3. Tipping of crowns of posterior teeth causes the marginal ridges to lie at different levels.

4. An unfavorable axial inclination of either anterior or posterior teeth is etiological. In a normal inclination, the direction of food thrust is along surfaces which are normally curved and whose angulation is so set up as to cause deflection of the food away from the free gingiva. With the lingual inclination of lower anterior teeth, for example, there is commonly found an inflammation of the labial free gingiva from the continued trauma of food sliding along the labial surface of the tooth. With a favorable axial inclination, the teeth and their supporting bone absorb the lineal occlusal stress, and lateral traumatizing thrust is minimized.

5. There are multiple forms of occlusal interference on mandibular excursion and occlusal strike. Perhaps most important is the problem of the close-bite with its many vicious sequelae. That this is true is borne out by the emergence of a new and rapidly growing specialty of adult bite rehabilitation.

A satisfactory anterior bite level, then, becomes a prime objective in orthodontic treatment. In some instances the anterior close-bite might result from a genetic pattern, and one can speculate on multiple skeletal factors which might contribute to this. From a clinical standpoint, these cases are difficult to treat; if corrected, regardless of whether one flattens out the arch with a full edgewise strap-up or uses a combination of bite planes, following removal of the appliances the retention index is low.

In by far the larger percentage of cases, however, the close-bite reflects a local symptom of the more generalized orthodontic problem. This is common to many Class II cases, including those cases in which there has been a premature loss of second deciduous molars with mesial drift of first molars and those cases in which the anterior teeth have been displaced by local factors and no longer antagonize one another but continue to erupt in supraclusion. If treated properly, these close-bite cases respond favorably and, if adequately retained, have a high retention index.

The occlusion is continually changing throughout life. There is a slow, gradual, but continuous, wearing of the occlusal surfaces of the posterior teeth. The end result of this is a gradual closure of the bite. At the same time, there is a wearing of the interproximal contact points of teeth, changing from a normal round curvature in adolescence to the flat surfaces of teeth in middle age. Consequently, there is a resultant mesiodistal diameter loss in the adult tooth. This is a normal aging process which is further aggravated by poor dental restoration of contact surfaces.

As the individual mesiodistal diameter of teeth is reduced, likewise the dental arch length is reduced. This results, in part at least, from mesial drift of the posterior teeth, accompanied by a degree of bite closure. This may be minimal in many cases and considered a negligible factor, but it is nonetheless the dynamic trend in adult occlusions. Theoretical eruption of teeth is not compensatory in actuality. It is upon these occlusal trends that we inflict our orthodontic procedures, some of which, unfortunately, induce a further

significant amount of bite closure. Consequently, excessive pressure is put on the anterior teeth. As a result of this, we have several possibilities or combinations of possibilities which provide a source of continual need for dental attention in middle age.

We may have excessive attrition of either the mandibular incisors or the maxillary teeth, or both. This attrition sometimes wears through the enamel of the maxillary teeth, resulting in breakages and sometimes forcing the necessity of artificial crowns. Another possibility is the increasing irregularity of the mandibular incisors resulting from the bite closure, the mandibular anterior arch being contained more deeply within the maxillary arch. Still another possibility is the traumatic periodontal breakdown of alveolar support of the anterior teeth, generally the maxillary anterior teeth (Fig. 5, *A*). This will result when constitutional factors permit. Another effect resulting from anterior bite closure is the flaring and spacing of the maxillary teeth, which in some people becomes a progressive affair. These changes continue throughout life and are modified by varying factors, constitutional and otherwise, as to degree.

Fig. 5.—Occlusion of a Class II, Division 2 patient six years after treatment. Periodontal breakdown is limited to the anterior section where the closed bite is traumatic in functional excursion.

If the anterior bite level then assumes such importance in the adult occlusion, certainly in orthodontic objectives with children it must assume at least equal importance with the previously accepted posterior interdigitation recognized as normal and desirable. These orthodontic objectives cannot be divorced from one another, but rather are correlated to one another and to the manner of treatment. I shall leave this point now, but ask you to bear this factor of close-bite continually in mind in the discussion of diagnosis and treatment planning which follows.

In orthodontics we have passed from the era when it was assumed that a classical result was attainable in each and every case and we have entered another in which certain so-called biologic truths have been laid down which more or less clearly define the limitations of orthodontic treatment. I believe that it is axiomatic to say that if our treatment is to be successful it must be

fundamentally in accord with biologic principles. Herein are to be found the true sources of treatment possibilities and treatment limitations. However, we repeatedly see instances in which biologic truths are encumbered by loose wording and involved interpretations which are erroneously accepted as being part of the truth. A case in point is the underlying concept of a growing segment of the orthodontic profession, namely, that the skeletal pattern of the child is determined before birth, that the malocclusion after the eruption of the second molars represents the genetic potential of the child, and that now, having reached a state of balance, further increments in arch size are not orthodontically feasible. The first may be a biologic truth, but the two encumbering assumptions do not necessarily follow. An analysis of this concept is of paramount importance because, in essence, it is the heart and core of the schism in the orthodontic profession today.

Any such concept must be viewed in the light of etiological values. A study of etiology in orthodontics is an interesting one. In earlier years, the constitutional factor was considered to be a homogeneous one and most or all malocclusions were considered to be the result of local factors exclusively. This was, indeed, a gross error.

More recently phylogenetics has been considered a factor in the human dentition. We must recognize the possibility that herein may lie a basic underlying cause, even though we may not be equipped to identify it specifically with a malocclusion.

Genetics, on the other hand, provides us with more tangible evidence in the matter of etiology. Heredity, as well as environment, is a factor in physical characteristics and is instrumental in the development of an occlusion. Under certain conditions one or the other may appear to be insignificant, but their related nature may always be demonstrated.

A study of family histories and monozygotic twins provides ample proof that many factors are directly attributable to genetic causes. For example, tooth size and shape and eruption schedule are clearly so. Likewise, congenitally missing teeth which are of genetic and not congenital origin run clear-cut family histories. Missing maxillary lateral incisors are perhaps the most common, with mandibular second premolars running next. These are obviously due to the action of a dominant gene, which is sometimes sex linked. One can find this characteristic running throughout family histories for several generations. The so-called peg lateral incisor is an incomplete expression of that dominant gene.

The early dentitions of monozygotic twins,[6] that is, before environmental forces have had too great an opportunity to act upon them, tend to show identical tooth size, shape, and arch form. The dental defects here are either identical or mirror imaged in concordance with the left- and right-handedness factor. In these twins, too, it is possible to find identical ankylosed and overretained teeth.

One cannot deny the genetic factor operative in the variances of racial types of malocclusion—one may find long, narrow arches, broad, short arches, or "V"-shaped arches. We must, therefore, revise our concept of normalcy of occlusion to that of an individual norm. One must continually bear in mind that there is a genetic potential of growth of the dentofacial complex. This may be almost synonymous with the growth potential, assuming a favorable environment. Thus, we may call this the biogenetic growth potential. It is not at all certain exactly how the genetic forces operate in this growth potential, whether there is a unit inheritance or a multiunit inheritance of factors. The evidence would seem to indicate that the mandible and the maxilla are independent of each other. It would also seem that the teeth, alveolus, angle of the ramus, the ramus itself, and the body of the mandible are independent of each other. In the maxillary region, the maxilla, alveolus, and teeth, too, seem to be independent.

Inasmuch as the occlusion is dependent upon the integration of so many varying growth potentials, it is indeed surprising that we find so many favorable occlusions. A more detailed study of the above would readily call to our attention the fact that there may be multiple sets of growth potentials contributing to a Class II, Division 1 malocclusion, for example. Here each malocclusion might differ from the other in its origin and perhaps in its treatment and prognosis, even though the original conditions might appear on the surface to be synonymous.

Heredity, then, is responsible for and brings together a large number of varying parts. These parts comprise the whole of the dentofacial complex. Now if this whole or growth potential satisfies orthodontic standards, it is considered to be a good occlusion. There is no reason to believe, however, that every case can qualify. Herein we find a source of malocclusions.

The newborn child with his growth potential has a low, retruded, broad face which eventually matures into a high, protruded, and narrow face. Hence, the adult face is not merely an enlargement of the newborn face. The growth here is not a gradual one, but rather one of a series of interrupted growth spurts. The child must be viewed as growing at different rates and at different times in different places. A single observation of a patient at any one time might very well suggest a disharmony. Later, however, there may be a remarkable degree of integration of growth factors which may eliminate it completely.

It is a biologic fact that a twig on a tree is bent more easily during its formative and early stages of development than later. Likewise, it is equally true that the developing dentofacial complex is more susceptible to disturbance during those developmental years when its growth is more actively taking place. If normal physiologic factors cease to be present, or if extrinsic factors become operative, then the growth of the complex becomes disturbed.

There are many extrinsic forces which may disturb normal growth; among these, the endocrines may be operative. There are multiple and obscure diseases as well as nutritional deficiencies which may interfere with

tooth development and bone growth and which may have a subsequent effect upon an occlusion. One should recognize this possibility, although a specific correlation may be difficult.

Such a delay in bone growth may or may not be caught up by later growth, depending upon the severity and the extent of time over which such a delay takes place. There may also be a lack of coordination in timing between the bone development and the tooth development. If the timing of tooth eruption were coordinated with the specific levels of growth, they would be in harmony but there are many variables within the pattern of eruption. If we happen to have an early eruption of teeth associated with a slow rate of growth in the jaws, the teeth will be compelled to erupt wherever they can, many times producing a malocclusion. A later growth spurt, however, may integrate the situation sufficiently to produce harmony. However, the temporary irregularity and interlocking of certain teeth may not lend themselves easily to self-correction and a permanent malocclusion may result.

The developing dental occlusion, then, is dependent upon (1) the growth of the supporting bone, (2) the size and shape of the developing teeth, (3) the directional development and eruption of those teeth, and (4) the interaction and balance of forces operative upon the teeth and their alveolar processes. Very important among contributing causes in the third group are the presence of interferences, such as cysts and supernumerary, overretained, and ankylosed teeth. Traumatic injury to deciduous teeth is a common cause of deflection of the erupting permanent successors. Also to be considered are missing teeth, interproximal caries, peculiar shape and size of contacting teeth, and the presence of a frenum. This eruption is altered also by an imbalance of the supporting musculature, such as is evidenced in aglossia with its underdevelopment of the arches and a short hypertonic upper lip exerting a restrictive influence on the alveolar support of the maxillary teeth.

Another very strong factor affecting the developing dentition is the influence of a number of undesirable habits. From experience, we tend to associate certain types of malocclusions with the effect of certain habits. Not infrequently, however, a case history will present such a malocclusion with no evidence whatsoever of habits being operative. This does not alter the fact that habits, under certain conditions, do produce ill effects.

Indisputable evidence can be shown in cases of monozygotic twins. This may be shown where each may have a Class II, Division 1 malocclusion. In the thumb-sucking twin, the protrusion is accentuated and the bite opened. Here it would be wrong to say that the thumb-sucking caused the Class II, Division 1 malocclusion in each instance. However, it is accurate to state that in the one instance where thumb-sucking was evident the protrusion was accentuated. It is important then that we bear this concept in mind with reference to all such habits. Aside from the matter of thumb-sucking, we have finger-sucking, tongue-thrusting, perverted swallowing habits, and perverted

breathing habits, any or all of which might be operative to varying degrees, depending upon the manner and severity of the habit and upon the susceptibility of the patient to respond to such abnormalities.

We should note carefully the musculature as it affects the development of the dental arch. There are multiple possibilities of size, shape, and tone of the various muscles surrounding the dentition. These should be carefully observed in relation to a specific malocclusion. I have already mentioned the short hypertonic upper lip with its restricting effect on the alveolus of the maxillary anterior teeth. We have the opposite, in which there is an almost complete lack of tone of the orbicularis oris muscle, even to the point where a child has difficulty rinsing his mouth vigorously. Cases are commonly found in which the buccinator muscle may be two or three times the normal thickness. In such cases there may be a high incidence of constriction of the arch through the buccal area. This relationship is not to be dismissed lightly and should be considered in treatment planning.

Before leaving a discussion of those factors influencing growth and dental development, we should consider the purely dental component. In cases in which there has been a premature loss of teeth, interproximal caries, or faulty dental restorations, the contiguous and occluding teeth may react, producing arch collapse to such a degree that one might erroneously suspect an arch deficiency.

Not to be overlooked is the influence of the functional factor on the developing dentition. If we are to recognize the validity of Wolff's law, which correlates the relationship of function to form, we cannot disregard the influence of adequate function on the deciduous and developing dentitions. An early malocclusion with its associated malfunction may have a directional influence contrary to the optimum development of that occlusion. It may be restrictive in a mechanical sense or it may unfavorably influence the developing supporting bone and musculature to aggravate the condition further. Herein lies an objective for early treatment, which should be that of restoring normal function, insofar as it may be beneficial to the developing dentofacial pattern, still to be determined.

Any consideration of the genetic potential of the dento-, facio-, skeletal pattern, then, must recognize that this genetic potential runs the gamut of bizarre and incalculable environmental hazards. In many instances, the environmental factors are restrictive and prevent the genetic potential from ever being fully reached. On the other hand, without adequate environmental support the genetic potential also fails to reach its full limit. An example of this may be seen in cases of aglossia where lack of tongue function incompletely augments the full development of the dentition. Genetic factors, then, can do no more than govern the norm of reaction of the dentition to its environment. Conversely, it might be said that the environment alters the expression of the genetic factors. We must not consider heredity and environment as necessarily competing or antagonistic forces, but rather as being interwoven, each modifying the other, with their interaction determining the state of occlusion.

We must conclude, then, that the practice of assuming that malocclusions, as we find them, represent the inalterable skeletal patterns or the genetic potential of the dentition is a misconception based upon a fallacy.

The diagnosis of an individual occlusion requires a constant awareness of all these etiological factors mentioned, as well as a searching and continuing attempt to evaluate their proportionate etiological values in the individual case. In some instances, the solution is immediate and simple; in others, a bizarre mixture of factors, some or all of which are camouflaged and obscure, leaves all to the speculation of the individual orthodontist.

In attempting to arrive at the individual norm of a patient, one would do well to note the observation of Simon,[7] who said: "Anomalies are found everywhere . . . hence there must also be a normal. But this, alas, is a delusion—all we ever find are variations, endless variations; an exact, ideal norm does not exist, cannot exist. And this is our enigma; in theory we will never find the normal, in practice we forever feel its need and apply it constantly. . . . After we fully understand the constitutional and environmental influences that form the individual denture; which of these are helpful and which are injurious; which of these may be altered and which are unchangeable—then the fiction of the conception of a normal will of itself become historically useless." In determining the degree of variation from the individual norm, we should constantly bear in mind that the occlusion as we find it is not static but dynamic. We must interpret cautiously a single observation of a child, inasmuch as his occlusion is merely in a current phase.

Attempts to simplify and to cause diagnosis to fit some wayward statistical or physical data may be successful in isolated instances, but when this becomes standard procedure something less than a rough approximation to the truth is produced. There seems to be an increasing tendency to catalogue children into geometric patterns; this violates every concept of biology, for the individual child rarely corresponds to the averages so frequently quoted.

Currently, we see much emphasis being placed upon cephalometrics in orthodontic diagnosis. There is no denying that this might be a diagnostic aid for some, but there are many serious limitations in its use. Uniform control of the technical difficulties is not a simple matter. The problem of landmarks must be regarded as being only relatively accurate. Cephalometric x-rays give us, at best, only a two-dimensional picture of a three-dimensional problem and, unfortunately, in many cases much of the problem is in that third dimension. In no sense can cephalometric x-rays predict growth or changes that are orthodontically possible.

There is no clear-cut, simple geometric or mathematical formula for diagnosis of malocclusions. Like the surgeon, the orthodontist cannot avoid developing a sense of clinical judgment; this judgment is the resolution of the aggregate of his clinical experience and is measured in terms of his basic concepts of etiology and objectives. He learns to recognize and interpret

the signs and the symptoms that provide him with clues. He recognizes that these are a part of deviation within an individual norm and it is his problem to alter favorably a dynamic three-dimensional problem.

Diagnosis cannot be oversimplified; it demands:

1. An awareness of a growth potential by the dentitions of the parents and siblings, if seen.

2. An evaluation of facial contours by the standards already discussed.

3. A recognition of gross endocrine disorders or physical health factors.

4. A recognition of local factors contributing to the malocclusion, including the presence of related habits.

Diagnosis should consider:

1. The general form, size, and shape of individual teeth, with variations in relative sizes and their relation to other teeth in the arch.

2. The excess or deficiency in size of the arches, and variations in shape, and the relationship of the arches to each other.

3. The relationship of the individual arches to their supporting bone.

4. The path taken by the mandible in the normal act of opening and closing, to note any joint abnormalities. There should also be a study of the normal excursions of the mandible to note the interferences of occlusion and their effect on the arch.

5. The midline should be evaluated in terms of the midline of the upper face relative to the midline of the mandible and these, in turn, should be related to the midline of the dental arches, thus orienting the true source of deviation.

6. The analysis of the axial inclination of not only the anterior, but also the posterior, teeth. This inclination should be viewed in terms of the occlusal and other contributing factors and in relation to the supporting bone.

7. The presence and degree of bite level as related to the balance of occlusion and etiological factors.

8. Evidence of mesial and distal drifting of teeth within the arches.

9. A recognition of all those occlusal factors in a malocclusion, once established, which interact seemingly like a series of vicious and interwoven cycles to complicate further the developing malocclusion. These are multiple and varied, but tangible. This constitutes an ingredient in case analysis which, for lack of a better term, might be called clinical judgment.

Many prevailing concepts of treatment limit their mechanotherapy to the permanent dentition. This is difficult to understand. Many malocclusions, if untreated at an earlier age, continue to deteriorate until they have reached a very serious deformity in the permanent dentition. There are many beneficial results to be accrued from early treatment, but many orthodontists do not believe in treating the deciduous dentition. This may result from their difficulty in dealing with a child of such early age, from the lack of adaptability of their particular appliances to deal with the problem, and I believe, too, from their experience and possible failure to achieve their objectives. Regarding this latter, it should be said that the objective of treatment in the deciduous dentition should be to restore, wherever possible, a degree of normalcy which will elicit from the supporting structures an early assistance to the development of a full genetic potential. Where the potential is a desirable one, the prognosis is favorable. The converse is true. This procedure holds in the treatment of early Class II and Class III malocclusions and in the management of cross-bites.

In Class I cases, the picture is not as clear cut. A Class I occlusion in the deciduous arch is diagnosed as one that is too small or too narrow on a chronological level and in anticipation of the normal requirements for the eruption of the succeeding teeth. It may be said that broad arches with multiple interdental spaces would indicate sufficient arch length for the developing transitional and permanent dentitions. This, however, is not always the rule. Sometimes such arches are followed by crowded and irregular teeth. On the other hand, frequently reasonably small arches with no spacing at all seem to develop and integrate properly to contain well-developed permanent arches. There is no known method, radiographic or otherwise, that can predict accurately in such cases.

If treatment is started in the very narrow arches the objective should be a limited one, namely, that of providing the maximum change at that time consistent with chronological levels. This is to be considered the first stage of possibly a two- or three-stage treatment. The fact that such a case sometimes requires a second stage of treatment does not condemn the first stage as being a failure. The first stage has, as its limited objective, the accomplishment of those things which can be achieved during that period. In so doing, the requirements for the second stage of treatment should be reduced or even eliminated. I believe that in many cases in which extractions are resorted to in the permanent dentition, the benefits of early treatment might have made these extractions unnecessary.

As the deciduous arch prepares to receive the permanent incisors, normally we note a slight increase in interdental anterior spacings to provide for their eruption. Now we enter the transitional stage which, by all standards, is the most interesting and exciting one. Here, finally, the growth pattern as it has been influenced by environment begins to unfold. For the first time, we begin to sense the true tooth–arch size relationships. The erupting teeth begin to establish their intended arch form. Here, too, is the period in which

we find multiple deviations in exfoliation and eruption schedules, some ectopic and some otherwise, each comprising a source of malocclusion depending on the degree of integration or interference by the orthodontist. This is the age where the orthodontist, with intelligent observation and timely action, can accomplish the most for the patient with the least effort.

In this phase, the proper restoration of proximal contacts on primary and permanent teeth by the dentist can help maintain arch length. This arch length, too, may be maintained by conservative treatment avoiding the extraction of certain deciduous teeth. The teeth most intimately involved are the second deciduous molars, the presence and width of which help to determine the eventual position of the erupting first molars. This fact is a primary key to the prevention of some malocclusions. Where such teeth are lost at an early age, the insertion of a properly designed space maintainer and its careful observation render true service. Overretention of deciduous molars can deflect the premolars lingually or buccally and sometimes force their eruption to be mesial or distal of their normal position. Their occlusal lock may also disturb the opposing teeth in the opposite arch. Such teeth should be observed carefully and either ground or extracted depending upon the need.

Ankylosed teeth should be extracted, as should supernumerary teeth, if they affect the arch in any way. In the transitional age there is a progress toward maturity of thought in the child. There is a marked increase in his degree of cooperation regarding habit correction. Such habit therapy instituted at this age level can be very rewarding. This is the age, too, of developing cross-bites, either anterior or posterior. Many of these are amenable to throat-stick therapy for jumping the anterior bite and to simple, local orthodontic measures for correcting posterior occlusions. A word of caution regarding these, however: it should be ascertained that the anterior cross-bite to be so treated is purely a dental cross-bite and not a manifestation of a malrelationship of arches. Under these conditions, the simple throat-stick therapy might do more harm than good.

Sometimes posterior cross-bites are more than just local dental problems. They may be a symptom of a lateral deviation of arch relationships. This deviation can be corrected only by a basic change in arch form. Under these conditions, simply moving the teeth on one side restores the appearance of normalcy but leaves the occlusion in lateral deviation, with possible and unpredictable temporomandibular articulation consequences.

This transitional stage is interesting, too, because there are many apparent malocclusions which are perfectly normal. The inclined-plane relationship of the lower molar to the upper finds the lower molar lying slightly distal. There is a normal integration of these molars in the arch when the large lower second deciduous molar is lost which allows that first molar to drift into normal relationship with the upper. Another factor is the spacing which sometimes is normally found between central incisors. If there is no frenum or close-bite operative with this factor, these spaces tend to be self-closing with the eruption of the lateral incisors and canines.

Quite frequently the maxillary lateral incisors experience a peculiar eruption. They may enter the arch with the crown tipped slightly laterally and the roots pointed mesially. If no canine pressure against the root is present, these are generally self-correcting. In cases in which canine root pressure is present, after the eruption of the canine, if the spacing is adequate, there is a tendency for the lateral incisor to assume its normal position. This is not always true, however, and this canine–lateral incisor relationship may be an early diagnostic key to a deficiency in arch length.

If the intercanine width is small in the mandible, there is a tendency for the mandibular lateral incisors to erupt lingual to the canines. The question arises as to the advisability of extracting the deciduous canines to allow room for the lateral incisors. This may appear temporarily to justify its being done, but there are some dangers connected with this practice. First, there is a tendency for the mandibular incisors to drift distally toward the canine spaces and at the same time to tip slightly lingually. This results in the blocking out of either the canine or the succeeding first mandibular premolar.

Coincident with this, there is a tendency with this lingual axial inclination for the lower incisors to remove themselves from the occlusal strike against the maxillary incisors. This, in turn, allows both the maxillary and the mandibular incisors to continue their eruption beyond a normal limit, thus producing a close-bite. If this condition is allowed to remain until the permanent dentition is more fully erupted, a deformity is produced which might suggest the extraction of some premolars. This is, indeed, a stiff penalty to pay for the temporary convenience of improving lower incisor appearance. The correct procedure in such cases is to construct a lingual arch wire for the mandible, as described earlier, to maintain and improve the mesiodistal relationship between the mandibular first molars and the incisor teeth.

In the mandibular arch the mesiodistal width of the second deciduous molar exceeds that of its permanent successor by a varying but significant amount. A lingual arch wire here, by maintaining the original relationship, will provide this much excess space into which the crowded canines and premolars might erupt. In this preceding situation, then, we see where, on the one hand, by injudicious action or lack of action, a given case may be allowed to deteriorate to a point where extractions may be a necessary part of treatment. On the other hand, judicious and timely action in many cases can produce a set of circumstances which will allow for arch treatment without the necessity of any extractions.

The mixed dentition provides a fertile opportunity for full orthodontic treatment in many cases. As pointed out in the previous discussion relative to the mandibular arch, by maintaining the full arch length endowed by Nature, it is possible to guide the individual eruption of selected teeth into position. This is a procedure which may be followed in both arches, with the result that a number of malocclusions are resolved with the eruption of the last permanent tooth into position. In other cases, however, the treatment will then carry through into the permanent dentition for completion, but here

the over-all problem has now been minimized. In many cases treated in the mixed dentition, one notes an immediate improvement in facial balance. This is because treatment is being carried out during a period of active growth.

In the permanent dentition, cases in which there is adequate arch length ordinarily do not present any serious problem in treatment planning. In those cases in which there is a deficiency in arch length, however, the size and shape of teeth are noted and the aggregate of tooth diameters is determined. Rotations and spaces are evaluated against treatment needs. Axial inclination of the teeth is noted and these factors are evaluated against the molar-incisor distance as projected along the arch. The resultant deficiency then constitutes the problem in treatment planning.

There are several sources available for the reduction of this deficiency. In cases in which there has been lingual tipping of the incisors, labial tipping will slightly increase the arch size. In certain cases slight labial bodily movement of the incisors is warranted. Where indicated, molars and premolars may be tipped or moved in a posterior direction to increase arch length. This must be done with an awareness of the position of the second and third molars. In such distal movement of the buccal segments, there is an automatic increase in arch width. When the axial inclination of the teeth is favorable, it is possible to achieve some increase in arch width and length by buccal movement of the premolars and canines, within limits. It should be borne in mind that there are biogenetic limits beyond which this expansion will not be tolerated. This should always be done in the face of an awareness of supporting bone and the individual norm, and without violation of esthetic harmony.

The expression *biogenetic limits* is one which is used loosely to mean many things. More recently it has come to represent limits which are more fictional than real. We hear much of the unchangeable basal bone, although no one, including the anatomist, seems to know what it is or how its limits can be determined. There are countless examples of increase in arch size that can be demonstrated by orthodontists. Much of this is done within the genetic pattern in which the potential for such expansion exists. Here the index of retention is high. I suspect also that there are many instances in which arch increase has been obtained above the genetic potential and, given a reasonably long supervised period of retention, the results have been reasonably stable. Cases can be demonstrated which have been overtreated and expanded beyond reasonable limits with the anticipation of a degree of settling into desired position, followed by the case's failure to settle. This is the exception and not the rule. Unwarranted degree of expansion runs a high risk of relapse in the area of the maxillary first premolars and mandibular canines.

It is an interesting observation that where increase in arch length is resorted to in labial, buccal, or distal movement, in each instance there is almost an automatic anterior bite opening. Such arch changes should be undertaken with a calculated expectancy of such bite level changes and should be undertaken only when such changes can be tolerated. This is true also in the correction of most Class II relationships.[8]

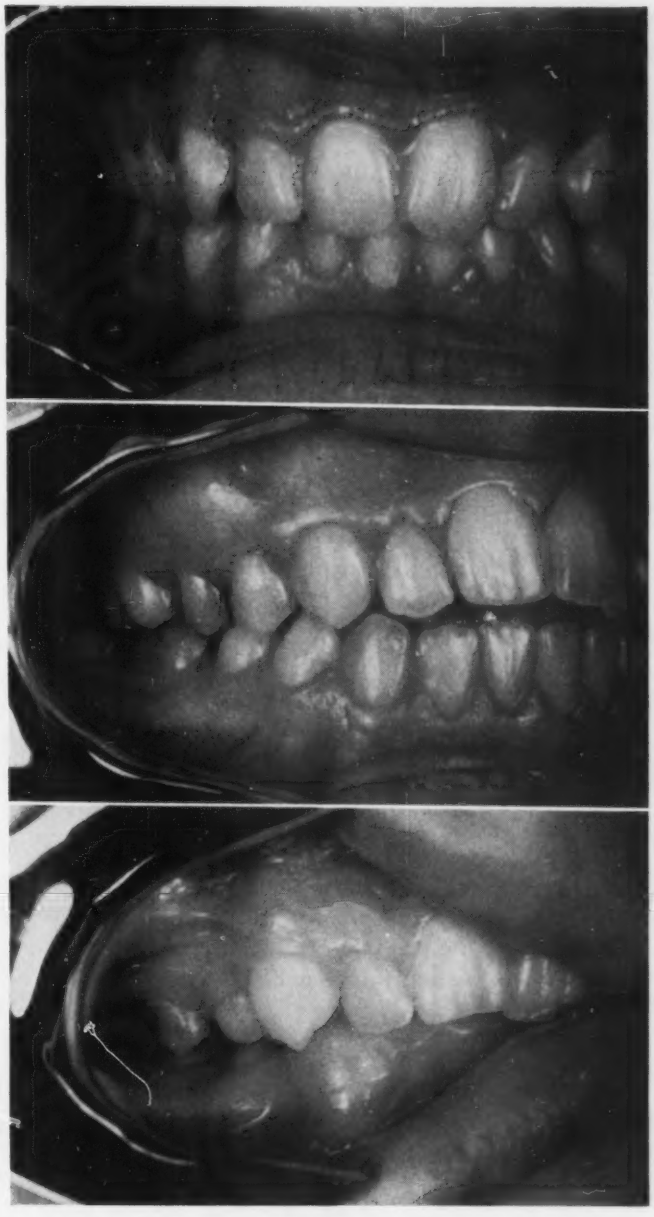
Most certainly, all cases are not amenable to arch increase. There are many in which the divergent axial inclination or the disproportion is so great that the extraction of one, two, or four teeth is clearly indicated. On occasion one finds it difficult to justify the use of appliances after such extractions. There are other cases, however, in which extractions are resorted to, where considerable mechanotherapy is required to balance the occlusion. Once more the bite level becomes a key factor in consideration of treatment planning. In extraction cases, there is almost an automatic closing of the bite. This is to be desired in edge-to-edge cases or in open-bite cases as a calculated part of the treatment.

In those instances in which the bite is already closed, extractions should be approached with a degree of caution and the selection of teeth for extraction should be predicated upon the bite level factor, among other considerations. Where maxillary first premolars are extracted, there is a degree of anterior bite closure. If maxillary second molars are extracted the anterior bite level can be retained without any bite closure, and in those instances where the maxillary first molar is moved distally one actually can expect a degree of bite opening.

In the mandible, however, we sacrifice our greatest amount of bite level. Here the extraction of premolars is followed by considerable increase in the occlusal curve with anterior bite closing. This is an anatomic phenomenon that occurs independent of appliance selection. In gross deficiency cases the closure is insignificant. In borderline cases, the amount of closure is directly proportionate to the amount of space to be closed. In those instances in which a full edgewise strap-up is used, the second molars can be banded to gain additional anchorage and the entire arch flattened. This is a dramatic procedure, but in two to three years following removal of the edgewise appliance there is once more a considerable degree of anterior bite closure.

The question in orthodontics is not whether to extract, but when and which to extract, and we have to weigh the alternatives against the resultant calculated trends in occlusal dynamics. Where excessive expansion is resorted to, one can expect a degree of relapse in proportion to the excessive expansion (Fig. 6, *A*). In such cases, too, an opened bite (Fig. 6, *B*) and a protrusive profile will be risked. On the other hand, when extraction procedures are applied to cases which might have been treated otherwise, many times the spaces are never completely closed. In others, they have been closed but the spaces recur, even though roots might have been paralleled. This is also relapse, but in another form, and one which constitutes a problem for the periodontist. At the same time, we find a retrogression toward a close-bite after retention has been dropped (Fig. 6, *C*). The seriousness of this relapse has already been indicated. Increasing anterior bite closure in extraction cases may restrict and crowd the mandibular incisors. This is now being erroneously blamed on "late and faulty growth patterns." Thus, we see that this business of relapse is a double-edged sword over our heads when we are indiscreet in either our expansion or our extraction policies.

Perhaps the most challenging group of orthodontic cases are those deficiency cases where all treatment measures short of extraction fail to provide quite enough room to align all the teeth. This deficiency will leave a



A.

B.

C.

Fig. 6.

slight irregularity. On the other hand, there might be clinical contraindications for extraction; there might be axial inclinations of teeth which would indicate a degree of difficulty in retaining space closures; or there might be a deep anterior close-bite. Here the choice is whether to enlarge the arches,

reduce the overbite, and risk a degree of relapse with some anterior irregularity or to extract and regulate with problems of retention, risking spaces and retrogressive close-bite along with facial loss.

In such a case, there is no ideal solution and one is forced to make a choice. This must be done in consideration of the future dental health of the patient in posttreatment years. However desirable it might be to have perfectly straight mandibular incisors, it is an indisputable dental fact, which can be demonstrated in any dental school's partial denture clinic, that the classical lower partial denture consists of suppling the posterior teeth where the six mandibular anterior teeth, however irregular, remain as the last and the most durable teeth in the mouth. On the other hand, now let us consult with the periodontist or the occlusal rehabilitationist concerning the advisability of our increasing the anterior bite closure, with its posttreatment consequences. We have the solution to our problem; the answer is being supplied by those who are most qualified to evaluate the future dental health of the patient. Is this not more reasonable than a strict adherence to an orthodontic dogma?

In some of our borderline cases, we might do well to look to the advantages of interproximal stripping of certain oversized teeth. Here we are applying our treatment to the source of the problem. In certain cases, also, it is possible to transfer the deficiency in a posterior direction by distal movement into the area of the third molars, with the calculated intent of planning third molar extraction.

We find very little mention of third molars these days, and yet many times we are, in effect, treating a thirty-two-tooth arch and not just a twenty-eight-tooth arch. Many third molars are directionally impacted and require extraction. However, due consideration of the position, spacing and angulation of third molars should be mandatory before distal movement is planned. In the past, third molars have been the scapegoat and have been blamed for various and sundry relapses. In many instances, the true source or cause of relapse has been injudicious expansion or failure to open the anterior bite. Now, we have gravitated to the other extreme, where the third molar is considered by many to have no influence whatsoever on the balance of occlusion. This is equally wrong.

It is a common occurrence to see untreated, clinically normal occlusions undergo considerable occlusal change prior to and coincident with the eruption or attempted eruption of mandibular third molars. This change terminates immediately upon the eruption or the removal of the third molars. This observation is outside the experience of many orthodontists, who seldom have occasion to see such untreated cases. The hazard of such changes after orthodontic treatment is more evident in expansion cases, but it is by no means eliminated by orthodontic extraction procedures. A consideration of third molars, then, is not to be eliminated in our retention procedures.

There is another group of orthodontic problems which, fortunately for us, constitute but a very small percentage of our cases. These are cases in

which there are skeletal facial asymmetries or skeletal open-bites with obtuse angles. Others are Class III cases with open-bites and obtuse gonial angles, micrognathic Class II cases, or those bizarre Class I cases which almost defy description and might be regarded as genetic accidents. These cases are peculiar unto themselves and must be approached with limited objectives in mind. Just as troublesome is that group in which the orthodontist is faced with persistent, uncontrollable habits or continuing local factors.

There is still another group in which we are faced with unhappy choices, such as the patient with the retruded profile and procumbent teeth. Do we improve the teeth and worsen the profile? We have the purely dental consideration in the matter of congenitally missing second premolars and oversized second deciduous molars. Do we extract the teeth early and align our displaced anterior teeth, while causing the dentist an endless prosthetic problem in restoration and supply of the missing tooth during the adolescent caries period? These cases are problems unto themselves and the rules of orthodontics are not applicable to them; nor should consideration of them be transferred to the matter of treatment of the classical orthodontic problems.

The next issue that I would like to discuss is appliance therapy. Each of us can adhere strictly to a system of orthodontic mechanics and produce satisfactory results in a group of cases that is tailormade for the system. This accounts for the many fine results obtained by orthodontists using different appliances, varying from the most simple to the edgewise appliance. However, applying a system to the infinite variety and broad spectrum of orthodontic problems is futile. This truth becomes increasingly evident to the orthodontist after his five- or ten-year honeymoon with such a system.

For a long time we have predicated our treatment planning on limitations of our mechanotherapy. Many cases that should have required extraction have been expanded because the appliance was not adapted to the problems of space management. This is an inherent weakness of some of the simple orthodontic appliances. Equally reprehensible are the multiple deficiencies of the edgewise appliances. They are not adapted to transitional treatment where much of the orthodontic problem can be reduced during that period of active growth. The necessity for awaiting full eruption sometimes permits a marked worsening of the malocclusion to occur. This is indeed singular, for in no other instance in medical and dental therapy is a condition permitted to deteriorate to the extreme before intervention.

The multiple thicknesses of twenty-four or twenty-eight bands, each with two interproximal thicknesses of metal and cement, require several millimeters of space for merely placing the appliance. In some instances, this is more space than is required to treat the case if such an appliance were not used. Additional arch increase under these conditions is difficult. Herein lies the source of many needless extractions just to accommodate the appliance.

Objectives in orthodontic treatment must not be subordinate to the limitations of an appliance. Valid objectives must be defined first and then

mechanical means must be developed to implement these objectives. It is not enough for us merely to create a transitory result, pleasing though it may be to the orthodontist, with little knowledge or regard for the later consequences. Our facial standards must be realistic and not those of the first century B.C. Neither should we set up facial standards because our mechanotherapy produces a certain kind of face. If we are to seek structural balance and functional efficiency, let us not treat our patients so that we have retrogressive postoperative changes resulting in close-bites. These retruded faces and close-bites constitute a grim specter on the orthodontic horizon which inexorably is going to "come home to roost."

In dealing with our occlusions, we must consider not only what is orthodontically possible, but also what is dentally desirable. Then our objectives will be truly realistic. Our concepts of treatment, then, must be predicated upon practical values and practical consequences and judged for true value solely by the standards of their workability.

Our present plight has resulted, in part, from the present state of orthodontic education. Its approach to dental problems has been a unilateral one. Like other specialties, ours has become increasingly specialized and dissociated from dental education. Consequently, a sharing and a critical analysis of orthodontic objectives have been lacking. This trend must, indeed, be reversed. What is wrong for the growing child certainly cannot be right for the orthodontist.

The purpose of an educational system is to sift out, determine, and evaluate all pertinent information relative to basic truths and, by so doing, to reject error. If effectively done, this should eliminate the necessity for each new generation to repeat the errors and, instead, permit them to go forward on the solid foundation of scientific truths. We shall then avoid the seesaw trends in orthodontic concepts that we have experienced in recent years.

We have passed from the abuses of excessive expansion to equally excessive extraction practices. We have seen the uncompromising cephalometric analysis, and the unyielding upright and straight mandibular incisor dogma, each having relative merit but each also having limitations and qualifications that prevent its unilateral use as a panacea. There is no method, there can be no system, in our differential diagnosis. In our mechanotherapy there can be no substitute for the development of skill, experience, and intuitive sense. These are indigenous to professional intellect.

Students caught in the initial whirlpool of enthusiasm for a dogma can see little else until the test of time brings them face to face with the harsh realities of the workability of their concepts. Concepts are valid only in so far as they can be translated into results. With our students, then, we must continue to cultivate high standards, but at the same time we must not saddle them with the yoke of unattainable objectives. Realistic attiudes toward perfectionism should be adopted. Otherwise, resultant failures cultivate a

sense of self-guilt which, on the one hand, stifles the development of orthodontic perspective and, on the other, frequently leads to reaction. Reaction, without the sobering effect of fundamental knowledge and experience, fosters extremism. This is our present dilemma.

The time has come for us to regard objectively the growing practice of appliance study groups. It is true that remarkable excellence in mechanics has resulted from this practice, but at the expense of something far more important. This inbreeding of experience and relationships fosters a loss of perspective regarding orthodontic objectives. Until there is more common agreement on realistic orthodontic objectives, these study groups will cause us to develop fractional insights and will serve to compound our failures.

Perhaps as important as any of the matters that I have discussed is the problem of our own behavior and attitudes. Being human, we are subject to human frailties. From time to time we might become intoxicated with our successes and develop delusions of self-grandeur as orthodontists. When we are confronted with inevitable problems and failures, we feel compelled either to hide them or to distract attention from them by aggressive and uncompromising attitudes toward those who hold different concepts. This is the fertile climate in which dogmas are born. We must, then, rid ourselves of any such delusions and accept with due humility the limitations placed upon us. However, we must ascertain that these limitations are real and not self-imposed or fictional.

In orthodontics there is no room for smugness, for no one can pretend to have all the answers. Vindictiveness can only widen the existing breach. Each of us is guilty of an unintentional, subconscious failure to view his results impartially and objectively. This is a human problem and one which will ever be present. We must develop specific attitudes toward new theories and practices. We must learn to distinguish between opinion and fact. We must resist regimentation of our thinking. Our open-mindedness must consist of something more than being willing to rearrange our prejudices. We must, on the one hand, regard new ideas with a healthy degree of skepticism until they are proved. On the other hand, we must be vigilantly willing to put these new ideas to the test of experience, but judge them solely by the standard of their workability.

I realize that much that I have said cuts directly across some of the prevailing concepts of our times. I can assure you that this has been done only after a considerable degree of self-examination and reflection. Perhaps some of you share these feelings which I have expressed. Others may feel that my remarks have been critical. If so, I can assure you that they reflect a healthy degree of self-criticism. If I have been severe in discussing problems and errors, let me assure you that I have made all of these. I do feel strongly that the time is overdue for us to meet this problem head on. Then with realistic objectives and common purpose, and being devoid of selfish motives, we shall

continue to move forward on common ground to accept more fully the professional responsibility incumbent upon us and truly to merit the heritage of orthodontics which is ours.

REFERENCES

1. Jackson, Andrew F.: Orthodontic Objectives, AM. J. ORTHODONTICS & ORAL SURG. 28: 486-512, 1942.
2. Denghausen, Franz (Gloucester, Mass.): Personal Communication.
3. Carpenter, Rhys.: Esthetic Basis of Greek Art, New York, 1921, Longmans, Green & Co., p. 140.
4. Beazley, J. D.: Greek Sculpture and Painting, New York, 1932, The Macmillan Company.
5. Field, Henry: The Races of Mankind, New York, 1946, C. S. Hammond & Co.
6. Wilson, William L.: A Consideration of the Possibility of Hereditary Diatheses in Dental Caries, J. Am. Dent. A. 33: 455-465, 1946.
7. Simon, P. W.: Fundamental Principles of a Systematic Diagnosis of Dental Anomalies (Translated by B. E. Lischer), Boston, 1926, Stratford Company.
8. Wilson, William L.: Variations of Labiolingual Therapy in Class II Cases, AM. J. ORTHODONTICS 41: 852, 1955.

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OFFICE PROCEDURES, BUSINESS MANAGEMENT, OFFICE LOCATION, AND ASSOCIATIONS AND PARTNERSHIPS

A Panel Discussion

Brooks Bell, D.D.S. (Moderator), Dallas, Texas, Stephen C. Hopkins, Sr., B.S., D.D.S., Washington, D.C., V. Everett Hunt, B.S., D.D.S., Eureka, Calif., Cecil Muller, D.D.S., Omaha, Neb., and Alexander Sved, D.D.S., New York, N.Y.

Prelimary Remarks (by Brooks Bell, Moderator)

THE above multiphrased subject can be concentrated into a single title, namely, "Practice Management." Practice management, in its final breakdown, consists of how you manage your practice so that you are able to render the best possible orthodontic services to your patients and in return receive satisfactory monetary payment.

The orthodontic service you render your patients is purely your own personal affair. The money you collect for your services, however, involves not only you, but also the members of your family. Consequently, there are many factors which must be considered. Many of these factors are covered in the booklet complied by the Necrology Committee of the American Association of Orthodontists. This booklet is now being revised and a copy will soon be mailed to each member of the A.A.O. Some of the factors not covered in this booklet will be taken up in this panel discussion.

It is suggested that the article entitled "Death and the Orthodontist" by William S. Parker of Sacramento, California, which appeared in the March, 1955, issue of the American Journal of Orthodontics be read to supplement this discussion.

Office Procedures (by Stephen C. Hopkins, Sr.)

First, I should like to recommend for your reading a book entitled *Practice Administration for the Dentist* by Mann and Easlick (published by The C. V. Mosby Company, St. Louis). This book is an evaluation of the Michigan Workshop held in Ann Arbor in 1953. Many items in this volume relate specifically to procedures in general practice, but many others can be most useful to the orthodontist.

Presented before the American Association of Orthodontists, New Orleans, Louisiana, May 16, 1957.

You may disagree with me when I say that we orthodontists are going to have to spread our services to a greater segment of our population. My thinking on this exposes the peculiar theory that the benefits of orthodontic treatment are just as important to the dentally crippled poor child as they are to scions of the rich. In support of this theory is the fact that the population is scheduled to increase by 11 million by 1960* and also that the Government may be forced by an enlarged and enlightened citizenry to take over if we cannot find ways and means of meeting orthodontic needs ourselves. Personally, I feel better doing the best I can for more people. I am also aware that there are definite limitations on what two hands can accomplish within reasonable hours.

In the Workshop discussions mentioned above, it appears that the best way to serve more people in a better way is to organize the office and make full use of sufficient and efficient office personnel. According to G. Archanna Morrison, an organization can be described as: "A group of persons working together for a common end. This common end should be to render most thorough services to a maximum number of patients in a minimum amount of time, and at the same time help the dentist to have a longer and healthier life." My own experience, based on the late Floyd Gibbin's ideas,** leads me to say that one has to modify arrangements a good deal to fit his own ideas, personality, and aims, but basically Gibbin's system was good. One of the flaws is that it seems that the more assistants one employs, the more work it takes to keep them happy and in good spirits and still obtain the results we might reasonably expect. One must be neither an angel nor a devil, but balance precariously between the two in these days of full employment.

Another reference I should make is to an article by the late Charles Waldo,*** in which he strongly hints that there may be less expensive ways of helping more people than always insisting upon pursuing every elaborate, time-consuming, and often unnecessary procedure in every case. Here again, there are limitations, for there should be no such thing as inferior or second-class service.

Although I am not an authority on either office management or orthodontic technique, I have found that one of the greatest ways to save time, annoyance, and money is to work out a number of forms for use by the patient, the parents, or both. These are multigraphed on ordinary sheets of paper or printed on cards and, if ordered in quantity, are quite inexpensive to use. (A difficulty here is that one usually desires to change the wording from time to time, and that means a new job of multigraphing or printing.) One must also see that the forms are read and not thrown into the waste basket. This requires special thought concerning format and wording, as well as special timing and technique

*Oral Hygiene, April, 1957.

**Gibbin, F. E.: Efficient Practice Management, AM. J. ORTHODONTICS 22: 1126, 1936.

***Waldo, C.: A Practical Approach to the Problems of Orthodontics, AM. J. ORTHODONTICS 39: 322, 1953.

in presenting the forms to the recipient who sometimes is not too aware of the importance of the wisdom contained therein. I shall list these forms in the order in which they are commonly used:

1. Preliminary consultation chart. This is used for the first consultation appointment and is partially, *but not wholly,* filled out by the assistant before the orthodontist appears. It has space enough for sufficient data (together with information regarding x-ray examination and casts) for working out a case analysis in most instances. We set aside a half-hour at 2 P.M. for this appointment, although normally we note that patients start drifting in for early afternoon appointments before our consultants leave.

2. Appointment card. Since I know that you are familiar with this type of thing, little need be said about this except to mention that our cards for regular appointments are blue and those for special appointments are pink for emphasis.

3. Pads of instructions. These are written in duplicate—one for the patient and one for our files—and give information and instructions in such matters as cavities present, failure of proper prophylaxis, extractions needed, wearing of elastics, etc. (These were borrowed from the office of Drs. Oliver and Oliver and have proved very useful.) We used to type them out in duplicate in the old days.

4. Original letter confirming plans and financial arrangements for treatment. We make two copies of this letter for possible future use. For instance, when a patient is transferred to a new orthodontist, a copy goes along and explains a great deal and eliminates a lengthy letter. If parents lose their original letter (as they often do) and some misunderstanding occurs, we can send them a copy. Also, we often make use of this copy device in the case of patients whose parents are divorced and when bills are being paid by a trustee.

5. Care-of-the-mouth form. This includes prophylaxis data, fluoride treatment, diet, etc. We present this when patients are placed on the list for starting treatment.

6. Rules. This includes rules covering such items as appointments, care of the mouth, avoidance of sticky candy, tampering with appliances, repair procedures in case of breakage, etc. It is included with the original confirmation letter.

7. Missed-appointment card. This is mailed immediately on the day an appointment is missed.

8. The valuable booklet put out by the Rocky Mountain Society of Orthodontists pertaining to whys and wherefores of orthodontics.

9. Serial extraction form. This is an explanation of the procedure in simple terms and includes a special card for the recording of clinical examination and extractions. This is new, of course, and we have yet to work out a final form that is useful in all respects.

10. Six-month form. This notes the results of treatment to date, the plans for further treatment, and desirable changes in cooperation and habits.

11. Retention form. This is given to the patient and parent at the close of active treatment. It lists information on when to wear the removable retainer and how to care for it, notes on myofunctional exercises, balancing occlusion, etc.

12. Recall forms. These are mailed at proper intervals as the names come up on the loose-leaf page of our recall book for the month.

13. Appreciation cards to the person referring a patient. Most of us use these for nonprofessional references, as it seems more appropriate to write a note with some explanation of findings for a professional reference.

14. A card for mailing to patients who have a special appointment coming up with definite time saved.

15. A form for the child to present to his teacher when he has kept an appointment during school hours.

16. A card for the child to place in his mirror, with brief but important rules in the form of do's and don'ts. This is brief and simple and was borrowed from Dr. Bill Curtis.

17. The A.D.A. pamphlet on orthodontic "Questions and Answers." We place this and various other information booklets in the reception room.

18. A special form for patients wearing extraoral gear and those doing muscle exercises is mailed to parents if we feel that the patients are not following instructions.

19. A special form for the general practitioner who is to do a prophylaxis and examination when some (usually anterior) bands are left on the teeth.

20. Then, of course, the appointment and day book, disbursements, accounts, treatment, and cash receipts records. This group has been prepared by Mrs. F. E. Gibbin and Dr. C. L. Whitman, Hackensack, New Jersey, and is available to all, so no explanation is required. The forms were originally worked out by Dr. Floyd Gibbin.

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Washington, D.C.

Investments—Collection of Delinquent Accounts (by V. Everett Hunt)

My contribution to this discussion is listed as "Investments—Collection of Delinquent Accounts." With your permission, I am going to reverse the order, since I do believe that it is necessary to acquire some money before you can plan on investing it.

In this discussion I can merely tell you what I do in my office and how it works for me. I make no claim that it is the one and only method of approaching this dilemma which besets all of us. Whatever success I have had has not come from one item of an infallible collection system, but is all part of a program that starts the first time that a patient and his parents present themselves. Because of time limitations, let me all too briefly outline the steps of this program:

First, on the original visit of the prospective patient and his parents, I estimate the cost unless I feel that there might be some aspect of which I am

not quite sure and would rather have the diagnostic material studied before rendering an exact decision.

Second, after making the diagnosis I meet with the parents at my desk. After talking about the pertinent aspects of the treatment I confirm the amount of my fee and ask if they have a preference as to the method of payment. In most cases I find that they will say, "Well, doctor, how do you want it to be paid?" or some variation thereof. The method of payment is not so important as the fact that the method will be written down and signed by the parents. That is right—a regular financial contract for payment of money that they owe. I have a regular bank contract form printed on my history cards and, after settling with the parents on the plan that is satisfactory to both parties, I fill in the spaces. After writing down the plan, I turn the card around and reread it to them. At the end of my dissertation I make a small check mark by the appropriate dotted line and ask them to sign. I have yet to have anyone refuse to sign the contract. It is the tone of one's voice that shows his confidence or his lack of it. Time payment plans for all types of merchandise and appliances have prepared the public in this respect.

While the parents are signing the contract I fill in a small card which I call a "financial memorandum" and which has a copy of the selected payment plan on one side and bookkeeping facilities on the other. I present this to them to take home as a reminder of their obligation and also for use in making out their income tax reports. Some men prefer a "letter of confirmation," which is every bit as good and merely a matter of choice.

I now ask the parents what day of the month would be the best for them to make their payments. Usually they ask me when I would like to have the payments. I try to get them all in by the tenth, but there are always a few variations due to paydays falling on different dates. I note these variations on the margin of the contract and on the memorandum card. The big thing here is to be sure and get a definite date, no matter when it is.

Now, what have we done? (1) We stated a definite fee for our service; (2) we held a businesslike discussion with the adults involved on the method of meeting their obligation and arrived at a suitable arrangement, including the dates on which the payments are to be made; (3) we made out a contract with this information; and (4) we had the contract signed. With these steps we have *virtually* eliminated any collection problem.

Now let me discuss the *virtually* in the last sentence. I have a series of four collection forms. I say "forms" rather than letters because we prefer to contact these persons by telephone if at all possible. This is much more effective than a letter, which is absolutely impersonal and almost ineffective. A letter can be thrown away without an answer, whereas the parents are on the defensive when talking to you. Also, you can get into trouble with a letter where you cannot portray your "tone of voice," and might have to do a lot of explaining to alleviate some hurt feelings. Each of these forms provides for the setting of a new definite date for the person to catch up on the missed payment—usually ten days from the date of the call. Each contact (form) gets a little more insistent

than the previous one, but is still polite. I do not know whether it is the preparation of the contract or the "good times" that we have been having, but it has been years since we have had to go past the second contact form.

Now for the other part of the presentation, namely, what to do with your surplus money. Actually it should not be the "surplus" that you invest. The amount invested should be a planned item just like any of the other expenses of your office, such as your insurance, taxes, etc. Be that as it may, I still have not changed my basic ideas since talking to you in Boston last year or in Chicago in 1954. That is, you should be investing for growth of capital and not for dividend income alone. We can all live off income now, so we should be investing our hard-earned money so that ten to twenty years from now we will have a good income and our money will also have kept pace with inflation and maybe even have done better than that. We want our money to work for us so that we may take it easy sometime in the future and not have lost purchasing power through concentration on dividends now.

Since last year a new factor has entered the picture and has clouded the short-term outlook. That factor is that business in general has slipped badly and will probably go lower before it regroups and heads back up into another inflationary period.

Ten to twenty years from now we will be in more of an inflationary period than we are now with regard to the purchasing power of our dollar. That is definite; therefore, we must have a corresponding appreciation of our capital. Stocks, real estate—everything but money—will be worth more than now, maybe not next month or in six months but the cycle is still moving up each decade and it will continue to do so.

We must all take inventory of ourselves and our financial picture and plan our estates carefully. Do not let this be a hit-and-miss proposition, by any means. Plan it just like you plan your treatment of each orthodontic case, step by step. Take as much time to figure how to invest those dollars as it took for you to earn them. Possibly you have a specialist in estate planning in your community; if he does not sell insurance or mutual funds on the side, he could be of great help in getting you started. Remember, I said "started." You are the only one who knows your particular situation and desires, so you will have to do the major part of it yourself after much study.

Incidentally, do not overinsure. When you are young you will want enough insurance protection to take care of your wife and family if anything should happen to you. After you have become established in your community, though (that is, when you are financially secure), your insurance should be only enough to help pay the Federal estate taxes that fall due upon your death. The trust department of your bank can help you on this.

The bulk of your money should be in a position where it will grow in value, to be used by you and your wife when you reach the later years of your life and wish to take it easy and not have to go to the office every day. Remember, build for the future; you can take care of yourself now.

In my part of the country real estate is at an all-time low, so I will not talk about that now. I am recommending stocks and bonds listed on the New York Stock Exchange for your present investment needs. With the price of common stocks high and with business conditions being what they are, I recommend that you now add to your bond portfolio rather than go all out for stocks. You might buy, let us say, tax-exempt municipal bonds or short-term government bonds. However, do not forget the common stocks entirely. Going back to the municipal bonds, these are all good, so your local broker can give you all the information that you need here. Do not buy revenue bonds, however, and do demand at least 3¼ per cent return on your money.

For the successful orthodontist I would suggest dividing the money he has available for investment into thirds. I would keep one third in cash to take advantage of any buying opportunities in the stock market. (In general, I believe that most common stock prices are too high and will come down in the not too distant future. There are some exceptions to this broad statement, but it takes digging to bring them out.)

I would put another third into tax-exempt bonds.

The other third I would invest in growth stocks on a dollar-averaging basis (that is, putting X number of dollars into stocks at regular intervals—say every three, four, or six months—regardless of price). Some good growth stocks that are still fairly priced and in the buying range are as follows: General Electric, National Lead, Standard Oil of California, Texas Company, Phillips Petroleum, Panhandle Eastern Pipe Line, Bank of America, Caterpillar, and U. S. Steel. After October I would add General Motors.

It is hard to generalize like this, especially in the time provided. However, I will be more than happy to answer any of your questions. Please feel free to call on me at any time.

707 I St.
Eureka, Calif.

The Suburban Office or the Downtown Office (by Cecil Muller)

I well remember that at the seminar held in Denver several years ago we had a Rutgers graduate speaking on investments and economics. He made this statement: "Gentlemen, in the hour allotted to me, I plan to tell you how to pyramid a small investment into a fortune. I have a logical way of telling you this, and it has worked. However, I am still a lonely professor making less than $10,000.00 a year." One member of that seminar followed this speaker's suggestions and invested in Phillips Petroleum, which worked out very beautifully. Then he invested in uranium, which the speaker said was highly speculative and lost his shirt.

My subject concerns office location. As a matter of history, we had been downtown in the central part of our city (Omaha, Nebraska) for nineteen years. We have been in the new location, which is definitely suburban, for four years. We sent letters to all our patients before the new office was constructed, and

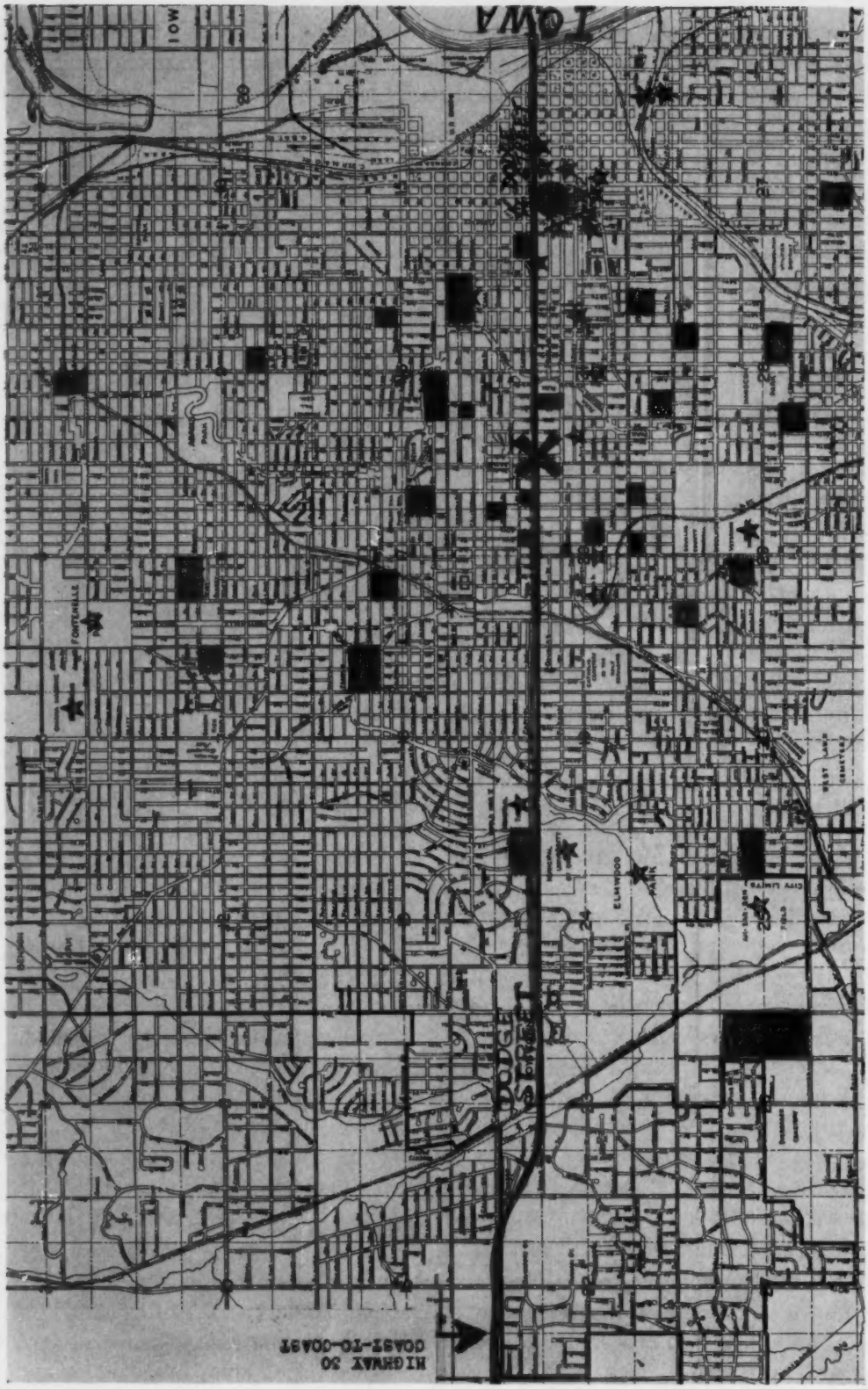

Fig. 1.—Map of the City of Omaha, Nebraska, showing the author's present and former office locations in relation to residential areas, schools, shopping centers, etc. Solid circle indicates old office in congested downtown area; X represents new office location; solid squares represent schools and shopping areas.

again after we were working in the new office, as of April 10, 1957. Better than 96 per cent said that they preferred the suburban location. The thing that they liked most was that there was plenty of available parking space.

Now, I suppose that you wonder how we picked this location. At the time of each patient's visit to the office, we checked his history card to see how he came to the office—by car, bus, bicycle, helicopter, dog team, or horse. (Well, gentlemen, after all, we live out West!) We checked as to whether he was accompanied by his parents, whether he ordinarily came during or after school, and which school he attended. We procured a map of the City of Omaha, and checked each school relative to the office and picked a location that would be convenient, as far as traffic lights were concerned, for children crossing the streets. We were most cognizant of the fact that the children and their parents should be able to get to the office easily from suburban areas and places out of the city, which meant that we should be on a centrally located arterial highway.

Since after four years better then 96 per cent said that they enjoyed the suburban office, I think that the proof of the pudding is in the eating. I want you to know that I have been most humble and sincere in making this survey. I well realize that an orthodontic problem in New York or San Francisco, where there is a greater number of orthodontists, is entirely different from one in Omaha, where we have patients who come from two or three other states, sometimes from a distance of probably 400 to 500 miles.

Fig. 1 shows the location of the office with regard to schools, traffic lights, and arterial highways.

The advantages to me of being in a suburban location are as follows:

1. There is less traffic. There are no parking problems. I can get to the office much more quickly.
2. There is less office pressure, as the whole office has been designed for greater efficiency.
3. Children like the playroom.
4. Parents can come to the office casually dressed and are more punctual.
5. The building has a more adequate maintenance.
6. There is less noise.

Investment-wise the advantages are:

1. The rental is comparable to that in the growing downtown area.
2. Property located in a going section appreciates in value, as does building and its rental space.
3. There can be rental tenants upstairs in the building if possible.
4. The loan is paid off monthly (so that some day, I hope, the building will be mine).
5. The building is designed so that in case of emergency or death it can be readily used for other types of business.

represent schools and shopping areas.

QUESTIONS AND ANSWERS

1. *Question:* About 30 per cent of my patients live in the same section of town. In contemplating a move from my present office in the business district, should I

(a) move into the above section, even though it is not too well located for the rest of my patients (not any worse than my present location, however) or

(b) move to a centrally located position that would be equal distance from all patients, even though I do not have any patients from the immediate area close to this location?

Answer: As Ralph Waldo Emerson said, if you build a better mousetrap than your neighbor, the world will beat a path to your door.

2. *Question:* Do you know of any formula to show what amount of money a man may invest in an office building in proportion to his income so that the investment will be profitable?

Answer: I would suggest that you talk to your auditor. Just be sure that in the event of an emergency you can keep up the interest and payments on the mortgage.

3. *Question:* How far are you from the Medical Arts Building?

Answer: I am about 2 miles from the medical building, on the main four-lane highway which goes through the center of the city.

4. *Question:* How do you arrive at the rate of rental for the rented part of your office?

Answer: Go to a reputable realtor in your city, and for a small fee he will give you a fair evaluation.

5. *Question:* Is your building incorporated? If so, do you pay rent to the corporation? Do you use a fast tax depreciation write-off because a portion of the building is a so-called "one-purpose building"?

Answer: The building is incorporated and I do pay rent. No, I do not use a fast tax depreciation write-off.

101 South 35th Ave.
Omaha, Neb.

Office Procedures (by Alexander Sved)

The keeping of records is not included in this presentation because that has been treated at length by Dr. Hopkins. I shall limit myself to the routine handling of patients at the office, which is a very important part of practice.

We classify our patients into three general groups:

1. The active cases, those which are under treatment.
2. The inactive cases, which include those under observation and retention.
3. New patients—consultations.

When making appointments we take into consideration the classification of the patient. As a rule, the active cases require approximately thirty minutes of

time (more or less). They are grouped together on certain days of the month, and on the days reserved for treatment no other patients are seen except for consultations and for impressions and x-ray pictures. The reason for this is clear. The number of patients under observation and retention exceeds those under active treatment and, while their visits are short, they interfere with the work on the active patients. They usually cannot understand why they have to wait an hour for a five-minute visit. In order to avoid such disturbances, all patients under observation and retention are requested to come on a specially reserved day, when we can see them at the rate of ten or twelve an hour. There is no work done on those days, but the periodic review of cases is very important, so that we may advise patients on the use of the retaining appliances and thus guard against relapse. Inasmuch as nearly all appointments are of five minutes' duration, there is no reason for a long wait. By this procedure we dispose of some sixty patients on one afternoon and they do not interfere with the other work.

In arranging the other work, the month is divided into four weeks. The first three days of the first and third weeks are reserved for the construction of appliances, the two corresponding Friday afternoons for the observation and retention cases, and the remainder of the time is given to treatment. The patients under treatment are given thirty minutes of time; thus we see six patients in the morning and seven patients in the afternoon. The last appointment is made for 4 o'clock. The advantage of this arrangement is that there is always enough time between appointments to take care of one or two patients who should have bands recemented or new bands made.

When a new patient arrives for consultation, the parent or guardian is requested to fill out a card on which it is plainly stated that there is a consultation fee (suggested by George M. Anderson). After the card is properly filled out, the patient is examined and the important details are pointed out to the parent. Further discussions of the case are continued in the private office without the patient being present, when such matters as habits, cooperation, and prognosis are fully covered. Before the question of the fee is considered, it is made clear that the patient can be accepted for treatment only if he will accept any appointment available at the time the appliances are made. This usually brings on the complaint that the child goes to school, and that the school authorities will not permit him to go to an orthodontist's office during school hours. We explain to the parents, however, that inasmuch as they are about to spend a considerable sum of money for the services to be rendered, it is important that they make it possible for us to render the best possible service. If they insist on the child coming after school hours the child will not be accepted for treatment, and they are advised to seek the services of another orthodontist. When it is further explained that we see the child only once a month for adjustments and that there is a long waiting list, they usually accept the condition that the child will come to the office during school hours. Of course, the schools do not like to excuse children for orthodontic appointments and the reason is that the school is responsible for the child between the hours of 9 a.m. and 3 p.m. They are relieved of this responsibility, however, by a written request from the parent that the children be excused at certain hours so that they may keep their appointments

with us. When I realized that it is imperative that we see the children during school hours for treatment, I contacted several schools and discussed the problems with the men in charge. I found very little cooperation; in fact, I was told that giving such permission would disrupt the classes and that the children would not be permitted to leave school for orthodontic appointments. It was necessary for me to talk to each parent separately, and I put it up to them to arrange matters with the schools or otherwise take their children elsewhere. Today this problem is solved and I have no difficulty taking a child out of school for an appointment. These matters must be discussed with each patient and the parents before the fee is presented and before arrangements for treatment are made. When this is fully understood, there is no further difficulty with either the patient or the school regarding future appointments.

If the fee is accepted by the patient's parents, a letter is sent out stating the terms of the contract, and two appointments are arranged—one for the impressions and x-ray pictures and another for the construction of appliances. At that time it is made clear that the fee remains the same, regardless of the length of time it may take to complete the case. If the case runs beyond the estimated time no further payment will be required, but if the case is complete before that time the balance becomes due upon completion. This is acceptable to all patients and we have no difficulty with the fee.

The division of the fee into its three components—namely, appliance fee, monthly adjustment charge, and the cost of the retaining appliances—effectively solves the problem of transfer patients. In the event of transfer we have no further say in whatever the patient or the orhodontist in charge may choose to do. It is further explained that, because of the difference in the methods employed, the work of the new orthodontist should not be hindered, that if he desires a change in procedure it would be to the interest of the patient to allow such a change, and that a free hand must be given to the orthodontist in charge at all times. Inasmuch as each payment made by the patient is earmarked, there is no question of further payment, except in the case of delinquent accounts, and refund is never expected. The transfer patient should make a new financial arrangement with the orthodontist in charge for the completion of the work.

The services of a dental hygienist may be utilized in an orthodontic practice, but only to a limited extent. The hygienists are not permitted to perform any work other than prophylaxis in the mouth, and no attempt should be made in an orthodontist's office to give more than a superficial cleaning. We cannot and should not take this work over from the general practitioner, as that would throw the burden of a thorough examination upon us, and this properly belongs to the general practitioner. There is danger that if periodic prophylaxis is given to the patient at the orthodontist's office the patient will not visit his dentist at regular intervals and, since we are not in a position to make a thorough examination, the patient may inevitably suffer. For the patient's own welfare, he should make regular visits to the family dentist.

113 West 57th St.
New York, N. Y.

Editorial

THE "BACKSWING" IS THE THING

THE catchword *new* is now the thing. If you don't believe that, watch television. The word has a magic sound and connotes better things and skills. It is used to make the impact on the listener of "off with the old and on with the new."

The carefully prepared profiles of pioneer orthodontists that are currently being published in this JOURNAL are remindful of the fact that many concepts that appear to be new in the orthodontic field are, in reality, old methods or ideas called up for re-examination and review.

Dr. Norman Kingsley, for instance, was one of the very first to use the headcap in the previous century. He used the device for the same purpose that it is used today. The use of the headcap, however, faded for years, partly because of the great difficulty in securing the cooperation of the patient which led many to reason that the cure was worse than the disease.

Then came the movement of the roots of teeth. Dr. Calvin S. Case, one of the pioneer specialists in Chicago, is reported to have been the first to advocate the movement of the roots of the teeth in harmony with the movement of the crowns. The method was tried in many ways, practically abandoned at one time, then resurrected, and became popular at a later date in several types of appliances.

Dr. Henry Baker, of Boston, first used the intermaxillary anchorage, which later became known as the Baker anchorage. Some of the pioneer orthodontists traveled halfway across the continent of North America to observe the actual results in Dr. Baker's office and to see proof that he really did shift the mesiodistal occlusion of teeth, using ordinary small election bands stretched from arch to arch. The specialists came and were convinced. That was around the start of the present century. This technique was "new." Subsequently it was much overdone and suffered the usual backswing.

Late in the last century, extraction unlimited in orthodontics took the spotlight. That practice, however, faded rapidly when Drs. Angle and Davenport quickly established the sanctity of the basic foundation of the full complement of teeth as "the student's most important lesson" and one which must be adhered to in order to raise the standards of orthodontic practice. Years later came the backswing and opposition to this theory. This opposition was sponsored particularly by one of Angle's students, Dr. George Grieve of Canada, and was followed later by the teachings of Charles Tweed and others. The well-known premolar extraction era was ushered in and developed a large

following. Another backswing now seems to be here; a more conservative approach is obviously on the way. History again repeats itself and no other issue has been so highly controversial since orthodontics started. The issue is still unresolved in many minds.

Another overswing of the pendulum was toward the expansion of both deciduous and permanent arches, advocated by both rhinologists and dentists during the first and second decades of this century. A number of authors wrote profuse texts about the merits of this treatment as an aid to the cure of sinusitis. This swing also went overboard; however, it did contribute much to the progress of orthodontics. Convincing evidence appeared, backed up by interesting case histories, which convinced even the cynical that the expansion of dental arches as a treatment for child patients promised great possibilities to extend the area of the field of orthodontics and to help elevate the specialty in importance as a health service.

To get back, however, to that most persistent and controversial question of all time—the question of extraction—the focal infection extraction swing topped them all. It went all out. Physicians, dentists, and the public as well, believed that teeth were suspect and must be extracted if pulps or supporting tissue even were not of the best.

As a cure for focal infection, the extraction of teeth for adults, sans all consideration of the functional and esthetic roles of teeth, became the new order of the day. "If the cure of the disease is not known, try extracting the teeth," was the slogan. "The worst that can happen," it was said, "is to lose the teeth."

From medical journals and lecture platforms, the finger of scorn was pointed toward infected and pulpless teeth of any type, and many times even healthy teeth became suspect No. 1 as a cause for almost any disease from which the patient might be suffering. The focal infection "playback" gave dentistry its blackest black eye, and the impact reached the headlines of the lay press as well as all scientific journals. The focal infection excesses were badly overdone. In due course, physicians particularly acquired better judgment, and they found the backswing even refreshing and wholesome for a change.

Another great orthodontic swing was to gnathostatics which came from Germany, where it was developed by Dr. Paul Simon. This subject was given top priority in a very profuse amount of literature. The big swing did leave behind, however, the basis for cephalometrics and it did make orthodontic workers increasingly conscious of a more comprehensive basis for diagnosis than the routine survey point or cornerstone, the constancy of the upper first molar in its relative position in the maxilla. One thing is certain—the pendulum swung far and wide on this one too before gnathostatics settled down to a firm utility basis.

More swings are on the way toward cephalometrics, serial extraction, and the positioning of the lower incisors. No doubt they will all follow the

classical routine and eventually find their place of importance in relation to the problem at hand. Time will decide much of that answer.

It is interesting to watch the forces at work that ultimately bring into focus the over-all product—the real contribution to orthodontic progress. Often a ten- to twenty-year pull is required before the ultimate appraisal can be made.

If correspondence to the editor is any criterion, the simplification of orthodontic treatment is a swing now most ardently hoped for. Many realize that such a move is now quite possible and would be labeled with the catchword *new*.

Those who make progress in this field will not only contribute much, but will probably be in the front row of what appears to be the next big era in orthodontics.

One contribution to that progress undoubtedly will come from the field of functional treatment. There is an old epigram that says, "Pay more attention to the future than to the past, for that is where you expect to live." What is new today may become old tomorrow, notwithstanding the fact that *new* is now the thing and that the backswing will always be with us as it has in the past.

H. C. P.

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In Memoriam

EDMUND MELVIN JOHNSTON
1887-1957

EDMUND MELVIN JOHNSTON of Riverside, California, died on Jan. 11, 1957, at the age of 69 years.

Dr. Johnston was born in Fresno, California, on Oct. 22, 1887. He was a graduate of Vanderbilt University School of Dentistry, the College of Physicians and Surgeons in San Francisco, and the Dewey School of Orthodontia. He entered the general practice of dentistry in 1908 as an apprentice in the office of Dr. B. B. Cory in Fresno. From 1912 to 1914 he was associated with Dr. O. M. Polin in San Luis Obispo, and from 1914 to 1922 he practiced general dentistry in Fresno. He began his orthodontic practice in Riverside in August, 1924.

Dr. Johnston was a life member of the Southern California State Dental Association, and also belonged to the Pacific Coast Society of Orthodontists, the Southern California Orthodontic Study Group, and the Tri County Dental Society. He was a past-president of the Tri County Dental Society and past-chairman of the Southern Component of the Pacific Coast Society of Orthodontists. He was a member of Kappa Sigma, Psi Omega, and Omicron Kappa Upsilon fraternities.

Dr. Johnston, who served as a first lieutenant in the U. S. Army Dental Corps during World War I, was Premier Grand Chef de Gare of 40-8 (state) and a past-commander of American Legion Post 4 in Fresno. He was a Mason and a member of the Riverside Rotary Club (of which he was a past-president).

He is survived by his widow, Mrs. Ethel Thomas Johnston; a son, Colonel Robert Donald Johnston of the U. S. Air Force; and three grandchildren. Another son, Edmund M. Johnston, Jr., died in an automobile accident in 1936.

Department of Orthodontic Abstracts and Reviews

Edited by

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The Double-Headed Mandibular Condyle. By H. J. J. Blackwood. *Am. J. Phys. Anthropol.* **15**: 1-8, March, 1957.

An unusual developmental anomaly of the mandibular condyle in which the condylar head is divided anteroposteriorly into two separate articulating surfaces was described in 1941, by Hrdlička, who reported the condition in twenty-one human jaws of varied racial origin, twelve of which showed a more or less complete division of the condylar head while in the remainder the division was incomplete. Schier, in 1948, detected the condition radiographically in a patient's right mandibular condyle; the left condyle presented a normal outline.

In a recent study of the development and growth of the mandibular condyle, the author was impressed by the extent to which the condylar cartilage, during its early stages of growth, is divided by well-vascularized fibrous tissue septa.

In an examination of ten human fetal skulls of ages varying from 8 weeks to 28 weeks, it was found that the septa first appear in the condylar cartilage at approximately 20 weeks of intrauterine life, and even at this age they can be seen to extend for a considerable distance into the medullary cavity of the developing ascending ramus. Thereafter, the number of septa within the cartilage appears to increase toward full term and reaches a maximum several months after birth. These structures remain a constant feature of the condylar cartilage during the first year or more after birth. Toward the beginning of the second year of life the septa become fewer in number and the cartilage begins to "even out" until it assumes a uniform thickness over the head of the condyle, as in the more adult form. In the present study twelve human temporomandibular joints, ranging from full term to 2 years of age, have been examined, but no septa were found in specimens older than 19 months, and in the specimen of that age only one small septum remained. Prior to 19 months the septa were present in all the condylar cartilages examined.

The septa are composed of solid cords of spindle-shaped cells resembling fibroblasts, and carry a rich supply of blood vessels. These vessels enter the septum only from its free end within the medullary cavity and course upward toward the cartilage, where they ramify in the deeper layers but never penetrate beyond the intermediate cell layer. The vessels vary in caliber, but are seldom more than large capillaries. The longer septa, which extend deeply into the medullary cavity, are bounded by thin trabeculae of bone which have formed on a "scaffold" of calcified cartilage matrix, but the more numerous shorter septa are bounded by the adjacent proliferating cartilage cells.

In view of the histologic evidence presented it would appear to be a reasonable assumption that should one of these septa persist, perhaps in a more extensive and exaggerated form than those illustrated here, then an uneven or

bifid development of the mandibular condyle might easily result. Alternatively, rupture of some of the small vessels within the cartilage as a result of mechanical injury to the condyle early in postnatal life might cause a localized impairment of ossification and so lead to abnormal development of the condyle. These theories are offered in an attempt to explain this rare but interesting developmental defect which, judging from the one case reported in vivo, is unlikely to cause any grossly disturbing clinical signs or symptoms but which, as Hrdlička pointed out, may lead to premature arthritic changes within the joint.

The Sequence of Calcification of the Mandibular Molar and Premolar Teeth. By Stanley M. Garn, Arthur B. Lewis, and Dorothy W. Shoemaker. *J. D. Res.* **35**: 555-561, 1956.

For recent whites the eruption sequence given by Schultz, namely, M_1 I_1 I_2 (P_1 C P_2) M_2, may be taken as representative. It matches the sequence of mean eruption times given by Fulton and Price and the means compiled by Hurme on 93,000 white children. The data of Clements, Davies-Thomas, and Pickett on Birmingham (England) white children give the M_2 P_2 variant as the more likely for the mandibular teeth in both boys and girls. For races other than white, the M_2 P_2^1 sequence has been reported and this latter sequence obtains in a number of fossil hominids, as it does among the great apes in general.

It was the purpose of this article to provide new data on the sequence of calcification of the mandibular molar and premolar in contemporary American white children and, further, to demonstrate the existence of several distinct calcification sequences and to provide evidence that these different sequences are familial in nature and very likely are genetically determined.

This study was based on serial oblique-jaw x-rays of 359 white boys and girls, aged 1 month to 15 years. These subjects, native-born residents of southwestern Ohio, were all participants in the Fels Longitudinal Studies and had been examined at regular intervals since birth.

The order of calcification of the mandibular molar and premolar teeth was determined for each child, primarily by reference to the age at which beginning (cusp) calcification was first noted for each tooth. Thus, if M_1 calcification was observed by x-ray at 1 month, P_1 calcification at 24 months, P_2 calcification at 30 months, and M_2 calcification at 36 months, the sequence was written as M_1 P_1 P_2 M_2.

This study, therefore, was semilongitudinal in nature and the number of cases used in each part of the analysis is given. The study refers to tooth calcification as seen in x-rays, and not to emergence or eruption. It is limited to those five teeth best visualized in oblique-jaw x-rays, which are superior to lateral-head x-rays for this purpose since there is no superimposition.

As shown, three of the five mandibular molar and premolar teeth appear to hold unvarying positions in the calcification sequence. M_1 was first in all of 293 cases observed, M_3 was invariably last in 140 cases, and among 202 cases P_1 was always the second of these five mandibular teeth to calcify.

P_2 and M_2 both exhibited considerable variability. In some children P_2 was third, and in others it was fourth. Conversely, M_2 calcification appeared third in some children and fourth in others. In a large number of cases (145), P_2 and M_2 calcification was noted for the first time in the same x-ray, and without evidence as to which should be assigned priority.

There was a definite tendency for P_2 to appear third more often than fourth (sixty-nine versus forty-three cases) and for M_2 calcification to appear fourth more frequently than third (seventy-six versus forty-seven cases). Furthermore, there was evidence that the order of calcification was influenced by

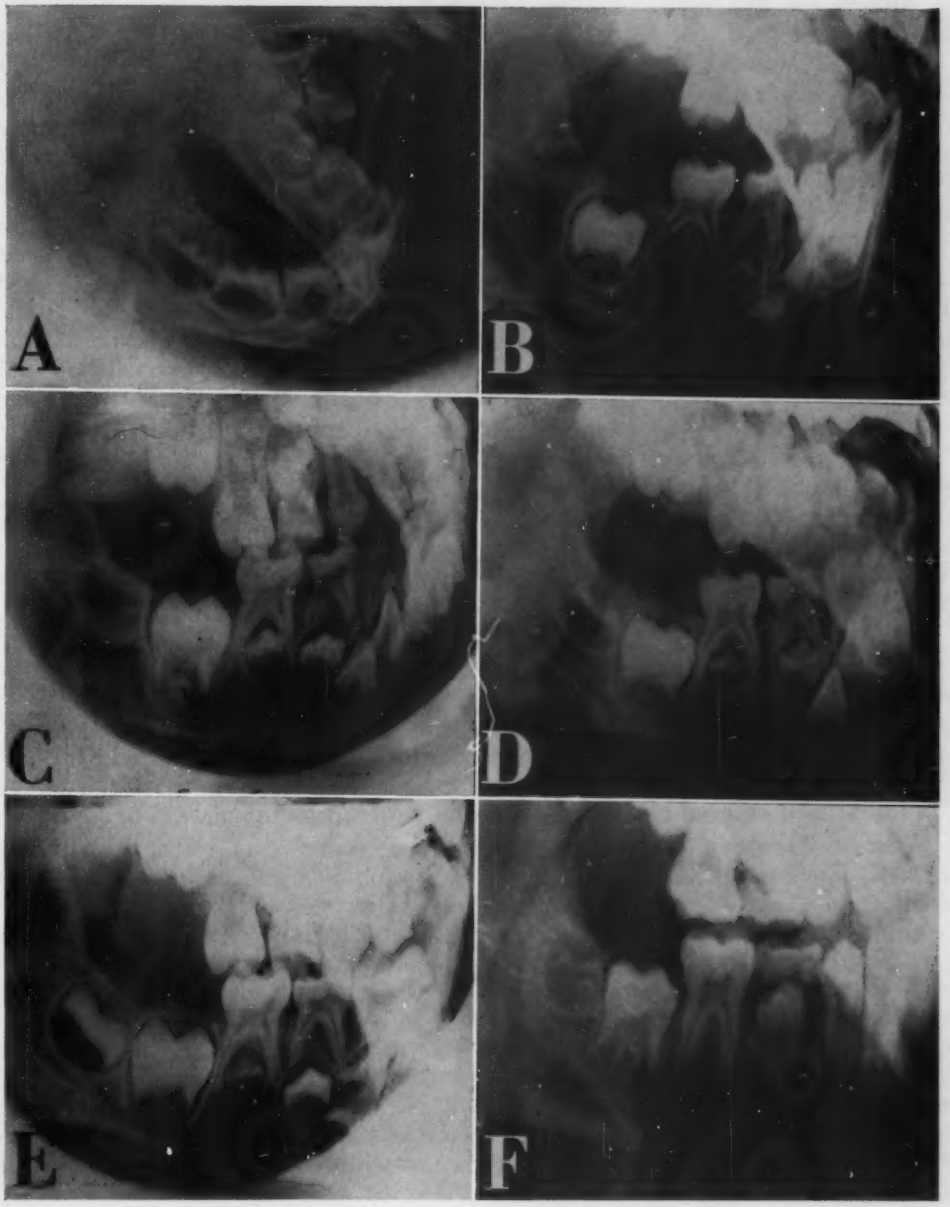

Fig. 1.—Reproduction of oblique-jaw x-rays showing calcification sequences described in the text. *A*, M_1. M_1 calcifcation evident, no other permanent teeth. *B*, M_1 P_1. M_1 calcification well advanced, early P_1 calcification. *C*, M_1 P_1 P_2 M_2. P_2 calcification extending to entire crown, M_2 cusp calcification only. *D*, M_1 P_1 (P_2 M_2). P_2 and M_2 equally advanced. *E*, M_1 P_1 M_2 P_2. M_2 calcification extending to entire crown. P_2 calcification at cusp coalescence stage. *F*, M_1 P_1 P_2 M_2 M_3.

sex. Thus, the precedence of P_2 calcification over M_2 was more clearly defined in the girls than in the boys. "Bunching" was significantly more prevalent in the boys (44.9 per cent) as contrasted with girls (31.4 per cent).

Among the 191 boys and girls for whom the entire sequence of calcification could be determined, the M_1 P_1 P_2 M_2 M_3 sequence, characterized by precedence of P_2 over M_2, was observed in 40.3 per cent. In 37.7 per cent the M_1 P_1 (P_2 M_2) M_3 sequence was assigned, since P_2 and M_2 calcification appeared simultaneously. In 21.9 per cent the M_1 P_1 M_2 P_2 M_3 sequence was manifest, with M_2 calcifying earlier than P_2. Thus, less than one-half of the children followed the simple M_1 P_1 P_2 M_2 M_3 sequence that might have been expected on the basis of the eruption means.

While these different sequences, P_2 M_2 (P_2 M_2) and M_2 P_2, might be attributed to chance, sibling pairings suggested that other factors were operative. Siblings paired with children exhibiting the P_2 M_2 sequence followed this sequence more often than would be expected on the basis of the population figures (66.6 per cent, as compared to 40.3 per cent). Among siblings of the (P_2 M_2) children, the P_2 M_2 sequence was less common and the M_2 P_2 sequence more common. Siblings of M_2 P_2 children showed an increased proportion with the same calcification sequence (45.5 per cent, as compared with a population percentage of 21.9 per cent).

There are three distinct sequences of calcification characteristic of the mandibular molar and premolar teeth, and these sequences depend upon whether calcification of P_2 precedes, follows, or is simultaneous with beginning calcification of M_2.

Percentagewise, the M_2 P_2 sequence occurred least often; yet it appeared in 22 per cent of both boys and girls. The P_2 M_2 and (P_2 M_2) sequences were almost equally common, and there was evidence that concurrent calcification of P_2 and M_2 tends to be a male characteristic. In beginning calcification, as in tooth emergence, "bunching" of these two teeth appears to be a male trait. In some undetermined way, sex influences the timing of tooth calcification, both in the dentition as a whole and differentially for different classes of teeth.

The evidence accumulated in this study does not support the idea that the different calcification sequences are merely chance combinations, such as the combination of an early calcifying second molar and a late calcifying second premolar. Rather, the P_2 M_2 and M_2 P_2 calcification sequence tends to pile up in family lines, suggestive at least of genetic control. It may be of some interest to note that children in the Fels series congenitally lacking P_2 tend to come from M_2 P_2 families, almost as though late P_2 calcification were the partial expression of a trait characterized by total suppression when fully expressed. This presents a new alternative to the concurrently accepted idea that reduced tooth size represents the partial expression of a gene favoring complete suppression. Eighty per cent of the children in this study conform in their calcification sequence to the sequence of emergence considered "typical" for white persons in general and characteristic of Indians as well.

SUMMARY

"1. The sequence of calcification of the mandibular molar and premolar teeth was investigated in serial oblique-jaw x-rays of 359 native-born white children from southwestern Ohio.

"2. M_1 P_1 and M_3 invariably showed initial calcification first, second, and last, respectively. P_2 and M_2 calcification varied in the order of appearance, and in many cases these teeth began to calcify at the same time.

"3. In the girls the tendency for P_2 to precede M_2 was more marked. The boys, however, tended to the (P_2 M_2) sequence, thus exhibiting 'bunching' in tooth calcification as they are known to do in tooth emergence.

"4. Among 191 boys and girls, the M_1 P_1 P_2 M_2 M_3 sequence was observed in 40.3 per cent, the M_1 P_1 (P_2 M_2) M_3 sequence in 37.7 per cent, and the M_1 P_1 M_2 P_2 M_3 sequence in 21.9 per cent.

"5. Siblings of P_2 M_2 children tended to the P_2 M_2 sequence and siblings of M_2 P_2 children to the M_2 P_2 sequence more often than would be expected on a chance basis.

"6. It was suggested that there has been a gradual evolutionary change from the M_2 P_2 sequence in the direction of the P_2 M_2 sequence, with a different rate of evolution in different hominid groups."

—Register Now—

Plan Now to Attend

1958 Meeting

American Association of Orthodontists

Commodore Hotel, New York City

April 27—May 1, 1958

On page 941 you will find an announcement concerning registration of members, associate members, and guests. Please read it carefully and act immediately.

Reservations for rooms should be sent directly to the Commodore Hotel, New York City. A full program of entertainment for the ladies has been prepared. New York is waiting for you.

News and Notes

American Association of Orthodontists, 1958 Research Section Meeting

Continuing the policy of recent years, one session of the program of the annual meeting will consist of ten-minute oral reports of research. Items submitted for this program by authors not in attendance may be read by title only. All persons engaged in research are urged to present the results of their studies at this session on April 29, 1958. Commodore Hotel, New York, New York.

Each participant is asked to prepare a 250-word abstract for publication in the AMERICAN JOURNAL OF ORTHODONTICS. Both the abstract for publication and the ten-minute oral report should be carefully prepared to present adequately the import of the investigation.

Forms for use in submitting the title and abstract will be sent to each dental school orthodontic department and to any individual requesting one. Please send the title and abstract as early as possible, but not later than Jan. 10, 1958, to Dr. Herbert I. Margolis, Department of Orthodontics, Tufts University School of Dental Medicine, 136 Harrison Ave., Boston 11, Mass.

Thomas D. Speidel, Chairman, Research Committee
School of Dentistry, University of Minnesota
Minneapolis 14, Minnesota

1958 Milo Hellman Research Award, American Association of Orthodontists

The annual prize essay contest of the American Association of Orthodontists is to be known henceforth as the Milo Hellman Research Award, by action of the Association at its 1957 meeting.

Eligibility.—Any member of the American Association of Orthodontists and any person affiliated with a recognized institution in the field of dentistry or associated with it as a teacher, researcher, undergraduate, or graduate student shall be eligible to enter the competition.

Character of Essay.—Each essay submitted must represent an original investigation and contain some new and significant material of value to the art and science of orthodontics.

Prize.—A cash prize of $500.00 is awarded for the essay judged to be the winner. The committee reserves the right to omit the award if, in its judgment, none of the entries is considered to be worthy. Honorable mention is awarded to the authors taking second and third places. The first three papers will become the property of the American Association of Orthodontists and will be published. All other essays will be returned to the authors.

Specifications.—All essays must be in English, typewritten on 8½ by 11 inch white paper, double spaced with at least 1 inch margins. Each sheet must be numbered and bound or assembled firmly in a "brief cover" for easy handling. The title of the essay should appear on the "brief cover." Three complete copies of each essay, including all illustrations, tables, and bibliography, must be submitted. The name and address of the author must not appear on or in the essay. For identification of the essay, its title, its author's name, and a brief

biographical sketch setting forth the author's professional training, present activity, and status (practitioner, teacher, student, research worker) must be typed on a separate sheet of paper and enclosed in a plain envelope. The title of the essay only must appear on the envelope.

Presentation.—The author of the winning essay will be invited to present it at the meeting of the American Association of Orthodontists to be held in New York, New York, April 27 through May 1, 1958.

Judges.—The entries will be judged by the Research Committee of the American Association of Orthodontists.

Final Submission Date.—No essay will be considered for this competition unless received in triplicate on or before Jan. 10, 1958, by Dr. William B. Downs, 314 North Lake St., Aurora, Illinois.

Thomas D. Speidel, Chairman, Research Committee
School of Dentistry, University of Minnesota
Minneapolis 14, Minnesota

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Commodore Hotel in New York, New York, April 22 through 26, 1958. Orthodontists who desire to be certified by the Board may obtain application blanks from the Secretary, Dr. Wendell L. Wylie, University of California School of Dentistry, The Medical Center, San Francisco 22, California.

Applications for acceptance at the New York meeting, leading to stipulation of examination requirements for the following year, must be filed before March 1, 1958. To be eligible, an applicant must have been an *active* member of the American Association of Orthodontists for at least two years.

American Association of Orthodontists
Registration of Nonmembers for Attendance at Annual Session

To insure full participation of all active members of the American Association of Orthodontists, the following classification of nonmembers eligible to attend and schedule of attendance fees, which will be charged at the time of registration, has been set up for the coming annual session of the Association at The Hotel Commodore, New York City, April 27 to May 1, 1958.

A. *No Attendance Fee.*

1. Full-time teachers in university dental schools.
2. Full-time graduate or postgraduate students in university orthodontic departments. It will be necessary to present a letter from the dean of the school certifying the status of the student.
3. Dentists from outside Canada or the United States of America who are members of recognized dental or orthodontic organizations.

B. *Attendance Fee—$10.00.*

1. Associate or junior members of constituent societies of the American Association of Orthodontists.
2. Recent graduates of university orthodontic departments who are in Government Service.

C. *Attendance Fee—$20.00.*

1. Recent graduates of university orthodontic departments who are not members of constituent societies of the American Association of Orthodontists.
2. Other guests.

Those persons who would be classified under the heading of C-1 or C-2 above are requested to apply to the chairman of the Credentials Committee at least sixty days before the session for proper forms, which will require (a) written endorsement by two active members of the A. A. O. in the applicant's vicinity, (b) that the applicant be a member in good standing of the American Dental Association, and (c) that the applicant never have been rejected for membership in any of the constituent societies of the A. A. O.

Those persons who would be classified under the headings of A or B would be required only to submit credentials identifying themselves as being in one of these categories at the time of registration. Advanced reservations, which are by far most desirable, can be applied for by clearing one's credentials with the Credentials Committee by March 1, 1958.

Registration under categories C-1 and C-2 will, of necessity, be limited.

C. Sterling Conover
Chairman of the Credentials Committee
1 East 57th St.
New York, New York

Middle Atlantic Society of Orthodontists

At a business meeting of the Middle Atlantic Society, held Oct. 22, 1957, in the Warwick Hotel, Philadelphia, Pennsylvania, the following men were elected to office for the next term:

President: Gerard A. Devlin, 121 Prospect St., Westfield, New Jersey.
President-Elect: Stephen C. Hopkins, Sr., 1746 K. St., N.W., Washington, D. C.
Vice-President: Kyrle W. Preis, 700 Cathedral St., Baltimore, Maryland.
Secretary-Treasurer: Paul A. Deems, 835 Park Ave., Baltimore, Maryland.
Director: George M. Anderson, 3700 N. Charles St., Baltimore, Maryland.
Alternate Director: Paul V. Reid, Medical Arts Bldg., Philadelphia, Pennsylvania.
Editor: Raymond C. Sheridan, 59 S. Orange Ave., South Orange, New Jersey.

Northeastern Society of Orthodontists

The fall meeting of the Northeastern Society of Orthodontists was held at the Hotel Statler in Buffalo, New York, on Oct. 21 and 22, 1957.

About 225 members and guests were registered for the meeting, which opened with a cocktail party on Sunday night. On Monday Dr. Spiller, Chairman of the Executive Committee, arranged a pleasant evening at Buffalo's Town Casino for a large number of members, their wives, and guests.

The scientific sessions commenced at 9:30 A.M. on Monday, when President Glaser called the meeting to order, and continued through Tuesday afternoon. The essayists and their presentations were as follows:

Symposium—Reconstructive Surgical Care of the Cleft Palate Patient. Leslie H. Backus, E. Hoyt DeKleine, and Robert M. McCormack.

The State of Your Estate. Harold M. Somers.

Treatment Planning—Part I. Clarence W. Carey.

Factors in the Early Treatment and Interception of Malocclusion. Edward A. Cheney.

A Modified Johnson Technique as Applied to the Treatment of Extraction Cases. Faustin N. Weber.

Cervical Traction, a Miracle Aid in Clinical Orthodontics. Sidney Asher.

Orthodontic Treatment Procedures for the Cleft Palate Patient. Malcolm D. Johnston.

The Technical Program in the Four Fundamental Treatment Forms—Part II. Clarence W. Carey.

The Board of Censors submitted the following nominations for action at the annual meeting in March, 1958:

President: Walter G. Bedell

President-Elect: Wilbur J. Prezzano

Vice-President: Henry C. Beebe

Secretary-Treasurer: David Mossberg

Editor and Sectional Editor: Joseph D. Eby

Assistant Editor: Brainerd F. Swain

Historian: Leuman M. Waugh

Board of Censors (For one-year unexpired term): Robert H. W. Strang

Board of Censors (For three-year term): Clifford G. Glaser

Dr. Norman L. Hillyer and Dr. Richard A. Lowy still have one year to serve as Director and Alternate Director to the American Association of Orthodontists.

Excerpts From the Bulletin of the Pacific Coast Society of Orthodontists

Official Bulletin Established 1922

Reuben L. Blake, Editor

240 Stockton Street, San Francisco 8, Calif.

Volume 33 No. 3

WELCOME ORTHODONTISTS

To the 25th bi-ennial convention of the
PACIFIC COAST SOCIETY OF ORTHODONTISTS
Organized in 1913

WHERE? In that beautiful American Riveria, Santa Barbara, between California's two metropolitan cities, Los Angeles and San Francisco on the coast.

WHEN? Feb. 23 to 27, 1958.

It is our desire to have one of the most pleasant, educational and interesting meetings possible.

WE WELCOME YOU TO SOUTHERN CALIFORNIA IN FEBRUARY, 1958.

Officers

President: A. Frank Heimlich, Santa Barbara, California.
President-Elect: Richard M. Railsback, Oakland, California.
Vice-President: Donald C. MacEwan, Seattle, Washington.
Secretary-Treasurer: Raymond M. Curtner, San Francisco, California.

Officers and Committees of Components

Northern Component

Chairman: James Keenan.
Secretary-Treasurer: Kenneth Kahn.

Central Component

Chairman: Oliver E. Hartman.
Secretary-Treasurer: Eugene E. West.

Southern Component

Chairman: Roscoe Reedy.
Secretary: Charles Linfesty.
Treasurer: Burton Fletcher.

Northern Component

Next meeting to be held in Portland on November 11.

Central Component

The meeting held at the Fraternity Club on September 10 was called to order by Chairman O. E. Hartman.

The meeting was then turned over to Program Chairman W. S. Parker, who congratulated and thanked R. Moeller, R. Bourquin, and A. Peterson for the cases they displayed for the group. Before introducing the guest of the evening, William Parker announced that our December meeting would be held on Wednesday, Dec. 11, 1957, at 3:00 P.M., with Dr. T. M. Graber as speaker. His presentation will be followed by a panel discussion on pressure habits, moderated by William S. Smith.

The speaker for the evening was Ted Grant of the Department of Oral Roentgenology, University of California. He discussed the importance of good roentgenographic technique if proper interpretation is to be made from the films available. Slides illustrating the various points which he discussed made the presentation interesting and pertinent.

Southern Component

The meeting was called to order by Chairman Keedy at 2:40 P.M., September 13, 1957, at the Huntington-Sheraton Hotel, Pasadena, California. Program Chairman George Boone introduced the speakers:

1. Dr. Charles Stewart of Ventura, lecturer in Southern California and Oregon, essayist, author, and inventor. Member of Gnathological Society of Southern California. Dr. Stewart talked on the function and physiology of occlusion and read a paper entitled "To Balance or Not To Balance Natural Teeth," which dealt in detail with occlusal articulation, His talk was accompanied by a number of excellent slides.

2. Dr. Ray Contino of Pasadena, who for five years has been teaching U.S.C. He is also a lecturer, essayist, author, and member of Crown and Bridge Academy. Dr. Contino talked on the importance of occlusal function and the role of the temporomandibular joint.

Pacific Coast Society of Orthodontists

The twenty-fifth biennial meeting of the Pacific Coast Society of Orthodontists will be held in Santa Barbara, California, Feb. 23 to 26, 1958. The program is as follows:

Sunday, February 23
Biltmore Hotel

9:00-12:00 A.M. Registration.
1:00- 4:00 P.M. Golf Tournament.
5:00- 8:00 P.M. Cocktail Party; entertainment, trio, buffet.

Monday, February 24
Biltmore Hotel

Chairman—Wendell L. Wylie:
- 9:15 A.M. Call to order. President's address. Business meeting.
10:00-11:00 A.M. Essay by Walter J. Straub.
11:00-12:00 A.M. Essay by Allan G. Brodie.
12:15- 2:00 P.M. Luncheon. Address of Welcome by Elmer R. Noble, Provost University of California, Santa Barbara. Coral Casino.

Chairman—Dallas R. McCauley:
2:15- 3:15 P.M. Essay by Robert M. Ricketts.
3:15- 4:15 P.M. Essay by Alton W. Moore.
4:15- 5:15 P.M. Essay by Richard E. Cline.

Tuesday, February 25
Miramar Hotel

Chairman—Dr. John W. Murphy:
9:00-12:00 A.M. Table Clinics (¾ hour to set up for lunch)

Chairman—Herbert V. Muchnic:
1:00- 2:30 P.M. Round-Table Luncheon.
12:00 M. Luncheon for women. Style clinic, of interest to everyone, showing how to build up a wardrobe with different ensembles.

Chairman—John S. Rathbone:
3:00- 4:00 P.M. Essay by Allan G. Brodie.
4:00- 5:00 P.M. Essay by Harold J. Noyes.

Wednesday, February 26
Biltmore Hotel

Chairman—Arnold E. Stoller:
9:00-10:00 A.M. Essay by Andrew Jackson.
10:15-12:00 A.M. General Symposium, Bill Smith, moderator.
12:15- 1:30 P.M. Lunch and business meeting at Coral Casino.

Chairman—Richard E. Cline:
2:00- 5:00 P.M. Limited attendance seminars.

Master of Ceremonies—Walter J. Furie:
6:00 P.M. Cocktails, steak dinner, wonderful entertainment, Montecieto Country Club.

General Symposium:

Brodie
Jackson
Noyes
Ricketts
Straub
Elsasser
Keenan
Sagehorn
Vale
West

Limited-Attendance Seminars:

Riedel
Chapman
Ricketts
Steiner
Cline
Paden
Crozat
Philbrick
Straub
Calmes
Moore
Brodie
Crawley

The essay program is general in character. The essay by Dr. Straub is on tongue function; Dr. Brodie's essay is not appliance therapy and is general in character. Dr. Ricketts will speak on growth as determined by his cephalometric studies. Dr. Moore will speak on Class II, Division 1, and Dr. Cline's essay will be reflections on crowded lower incisors. None of these essays will be aimed at appliance therapy. However, in the limited-attendance clinics appliance therapy will be presented and the members can choose the clinician of their choice. This should offer a program of interest to all orthodontists, regardless of appliance preference.

Pacific Coast Society of Orthodontists Central Component

The December meeting of the Central Section of the Pacific Coast Society of Orthodontists, which will be held in San Francisco at 3 P.M. on Wednesday, Dec. 11, 1957, has been planned as a bonus package to conclude the year.

The principal speaker will be T. M. Graber of Northwestern University, who will present a paper entitled "Finger-Sucking and Associated Muscular Perversions." Dr. Graber, who has been practicing, teaching, and writing for some time and is widely known and respected for his works, has recently returned from a tour of Asia and the Southwest Pacific made under the auspices of the U. S. State Department.

There will be a panel discussion on the general topic of thumb- and finger-sucking and associated muscular perversions. The moderator for the panel will be William S. Smith of San Francisco. The panel will include Dr. Graber, Maurice Kaplan (a San Fransicso psychiatrist with wide experience in this field who has published works on the subject), Everett Watkins of Eureka, California, Wendell L. Wylie of the University of California, and Walter Straub of San Mateo, California. (Audience participation will be invited.)

Herbert Foster, Warren Kitchen, Paul Fleming, and Ronald Koster will present a table clinic demonstrating completed and problem cases.

The scientific session will be followed by a recreation period. A wonderful holiday dinner will be served, and Santa Claus (Bill Smith) will distribute the presents.

Attention: Please take particular note of the fact that this meeting will be held on Wednesday, December 11, at the Fraternity Club in San Francisco. Dr. Graber will present his paper at 3 P.M., and the panel discussion will be presented at 4 P.M. The cocktail hour is scheduled for 5:30 and dinner will be served at 6:30 P.M.

Southwestern Society of Orthodontists

PRESENTATION OF THE MARTIN DEWEY MEMORIAL AWARD

The presentation of the Martin Dewey Memorial Award this year is of especial significance, for the recipient of this honor was the first dentist in this area of the Great Southwest to limit his practice to orthodontics. He was truly a pioneer, for at that time there were no other orthodontists nearer than New Orleans, St. Louis, Kansas City, Denver, Los Angeles, and San Francisco.

Our honoree, Dr. Thomas Gunter Duckworth, was born in Siloam Springs, Arkansas, on Jan. 20, 1888, the son of Louis Lafayette and Lavina Duckworth. His ancestry is a mixture of American and Cherokee Indian.

Gunter attended the Cherokee National Male Seminary at Tahlequah, Oklahoma, and received his dental education at the Kansas City Dental College from which he was graduated in 1912. He was a member of the Psi Omega dental fraternity and later in his professional career was made a member of the OKU honorary fraternity, a distinction paid him by Baylor University.

He practiced for a year in Kansas City with Dr. William J. Brady and assisted Dr. Martin Dewey in several early classes of the Dewey School of Orthodontia. Dr. Duckworth

was a member of the first class of the Dewey School. In 1914 he located in San Antonio, Texas, where he practiced for thirty-nine years. At first he shared an office with Dr. Robechaux, an outstanding oral surgeon of those early times. Shortly after locating in San Antonio he became editor of the *Practical Dental Journal*, a magazine published by a local dental supply company. A few years later he and Dr. Thomas O. Gorman became associates in practice and, as a team, augmented their service to their clientele.

Dr. Duckworth took an active interest in the advancement of his profession and generously presented clinics, discussions, and papers before various state and national dental and orthodontic groups. He was one of the founders and a charter member of the Southwestern Society of Orthodontists and was its president in 1924. In 1940 he was elected president of the Texas State Dental Society.

As for his civic activities, he was a member of the Rotary Club for thirty years, a member of the Alamo Heights School Board for fifteen years, and for eight years served as chairman of the Board of Managers for the Robert B. Green Hospital in San Antonio.

Along with his professional and civic responsibilities he did not overlook his hobbies and recreation—mostly sports. His golf was very creditable for one in a profession, and he enjoyed hunting, fishing, and ranching. On Aug. 30, 1930, at 10:10 on Sunday morning, using a No. 4 iron and a Dunlop ball, Dr. Duckworth made a hole-in-one on a 165 yard, 3 par hole on the ninth green at the Old Alamo Country Club Course. (The Associated Press did not record it until ten years later.)

Dr. T. G. Duckworth, recipient of the 1957 Martin Dewey Memorial Award.

Dr. Duckworth is a cousin of the late Will Rogers, with whom he shared many early experiences. In later years, he went with an orthodontic group to see "Will Rogers and the Ziegfeld Follies." Rogers, during his special rope act on the stage, recognized Dr. Duckworth in a selected front row seat and threw a lariat over his neck, which Dr. Duckworth quickly removed. Quick as a flash, Rogers reacted: "You could never get a rope around that fellow's neck in Oklahoma." Naturally, a roar of applause followed.

Dr. Duckworth has two sons, Thomas Gunter, Jr., a Colonel in the U. S. Army, now stationed in Puerto Rico, and Howard, who is married and has a daughter and a son. For twenty-five years Dr. Duckworth has owned a ranch near Boerne, Texas, on the Guadalupe River. Since he retired in 1951 he has made his home with Howard and his family in Boerne, thirty miles northwest of San Antonio, Texas. In his retirement, it is fortunate that he lives so near the surroundings of his life's endeavor. Here he enjoys over and over again former experiences with his friends. The stories which he relates so well, and often with a hearty chuckle, of his experiences in the upper country will hold you for hours. Dr. Duckworth has drawn to him a wealth of close personal friends, many of whom visit him regularly for a cheery chat.

Through the years he and Dr. Dewey spent many enjoyable and profitable hours in a warm fellowship.

As a lone eagle, so to speak, winging his way into the Great Southwest with a vision and determination to serve the needs of the public in the field of orthodontics, Dr. Duckworth established and built an enviable practice of a high professional standard, setting the pattern for professional conduct in proficiency, integrity, and ethics. Through his interest in the advancement of orthodontics and dentistry, his reputation grew beyond local bounds. In gaining this honor and distinction for himself, he has brought honor to orthodontics, to the dental profession, and to the members of the Southwestern Society of Orthodontists. He has richly earned and deservedly won the recognized title of "The Father of Orthodontics in Texas" and, I may add, of the Southwestern Society which has now grown to a family of 161 members.

So Gunter, on behalf of the Southwestern Society of Orthodontists and the Martin Dewey Award Committee, it is most fitting and our pleasure and honor to present to you the Martin Dewey Memorial Award.

MARTIN DEWEY MEMORIAL AWARD COMMITTEE
HARRY H. SORRELS
GUY M. GILLESPIE
W. E. FLESHER, CHAIRMAN

ACCEPTANCE OF MARTIN DEWEY MEMORIAL AWARD

For the past few years I have been compelled to accept an attitude of "what has been has been, and what will be will be." However, I have been able to keep up with these meetings fairly well, and the members of this Society are to be congratulated on the way you have carried through. This Society has always been useful and the programs have been informative.

When I received the letter from Dr. Flesher advising me that I had been selected to receive the Martin Dewey Memorial Award, I was very much surprised, as I had no idea that I could qualify for this distinction. The award means a great deal to me, as it was set up in memory of Dr. Martin Dewey, who was my friend, my teacher, and my inspiration, and who was responsible for my limiting my practice. It was a privilege to associate and work with him for many years, and I shall always be very grateful for his advice, his counsel, and his encouragement during my early days in practice. I realize the value of an award of this type, as it has quite an impact upon one's family and friends, and it is very much appreciated even though I might not be as deserving as others. I accept the award in the same spirit in which you have presented it to me.

Many thanks to all of you.

T. G. DUCKWORTH.

European Orthodontic Society

The next Congress of the European Orthodontic Society will be held in Copenhagen, Denmark, July 4 to 8, 1958. Information and enrollment form may be obtained from the

president of the Society, Professor Arne Björk, the Royal Dental College, Universitetsparken 4, Copenhagen, Denmark. The enrollment form must reach the president not later than April 1, 1958.

University of Alabama

The University of Alabama School of Dentistry at Birmingham, Alabama, has announced a course in preventive orthodontics to be conducted by Earl E. Shepard, D.D.S., Professor of Clinical Orthodontics and Chairman of the Department, Washington University, St. Louis, Missouri. The course will be given Feb. 15, 16, and 17, 1958.

Columbia University

The School of Dental and Oral Surgery of the Faculty of Medicine, Columbia University, announces the presentation of the following courses for qualified orthodontists:

1. Twin-wire Appliance Therapy. Joseph E. Johnson and associates.
   Dec. 2-7, 1957.
2. Theory and Practice of Extraoral Forces. James Jay and associates.
   March 10-15, 1958.
3. Edgewise Appliance Therapy. Clifford L. Whitman and associates.
   April 21-26, 1958.

Death of Dr. Paul Simon

It is with regret that the JOURNAL announces the death of Dr. Paul Simon of Berlin, Germany, on Oct. 19, 1957. Dr. Simon was 74 years of age. He was the author of *Fundamental Principles of a Systematic Diagnosis of Dental Anomalies*, a book dedicated to the American Society of Orthodontists.

Dr. Simon originated a classification of dental anomalies based upon gnathostatic methods of investigation, which he developed after extensive research. He was director of the Department of Orthodontics of the Dental Institute of the University of Berlin. Dr. Simon's book was published in 1926 and was translated into English by Dr. B. E. Lischer of St. Louis, Missouri.

Notes of Interest

Dr. Sigmund F. Faye announces the opening of his office for the exclusive practice of orthodontics at 2300 Napfle St., Philadelphia, Pennsylvania.

Dr. George F. Gales announces the association of Dr. William J. Baker in the practice of orthodontics, 68 Russell Park, Quincy, Massachusetts.

Dr. Myles F. Sweeney, 100 Quimby St., Westfield, New Jersey, announces the opening of his Somerville office at 31 N. Dougty Ave., practice limited to orthodontics.

Forthcoming meetings of the American Association of Orthodontists:
1958—Commodore Hotel, New York, New York, April 27 to May 1.
1959—Statler Hotel, Detroit, Michigan, May 4 to 7.
1960—Shoreham Hotel, Washington, D. C., April 24 to 28.
1961—Denver, Colorado.
1962—Los Angeles, California.

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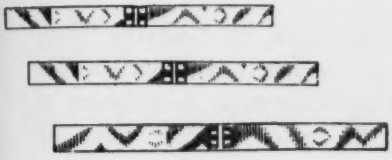

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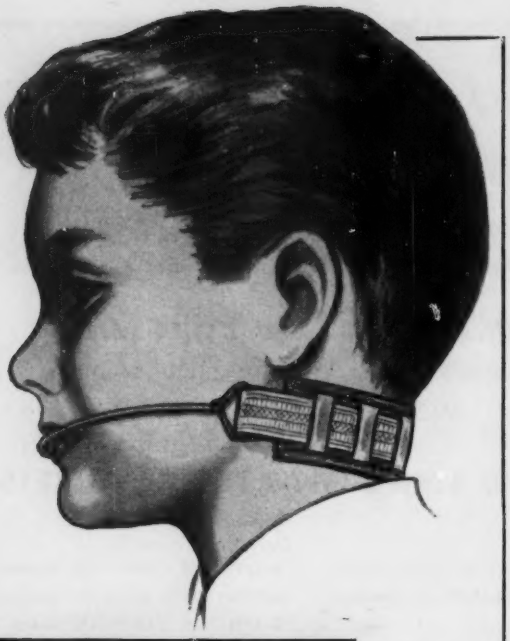

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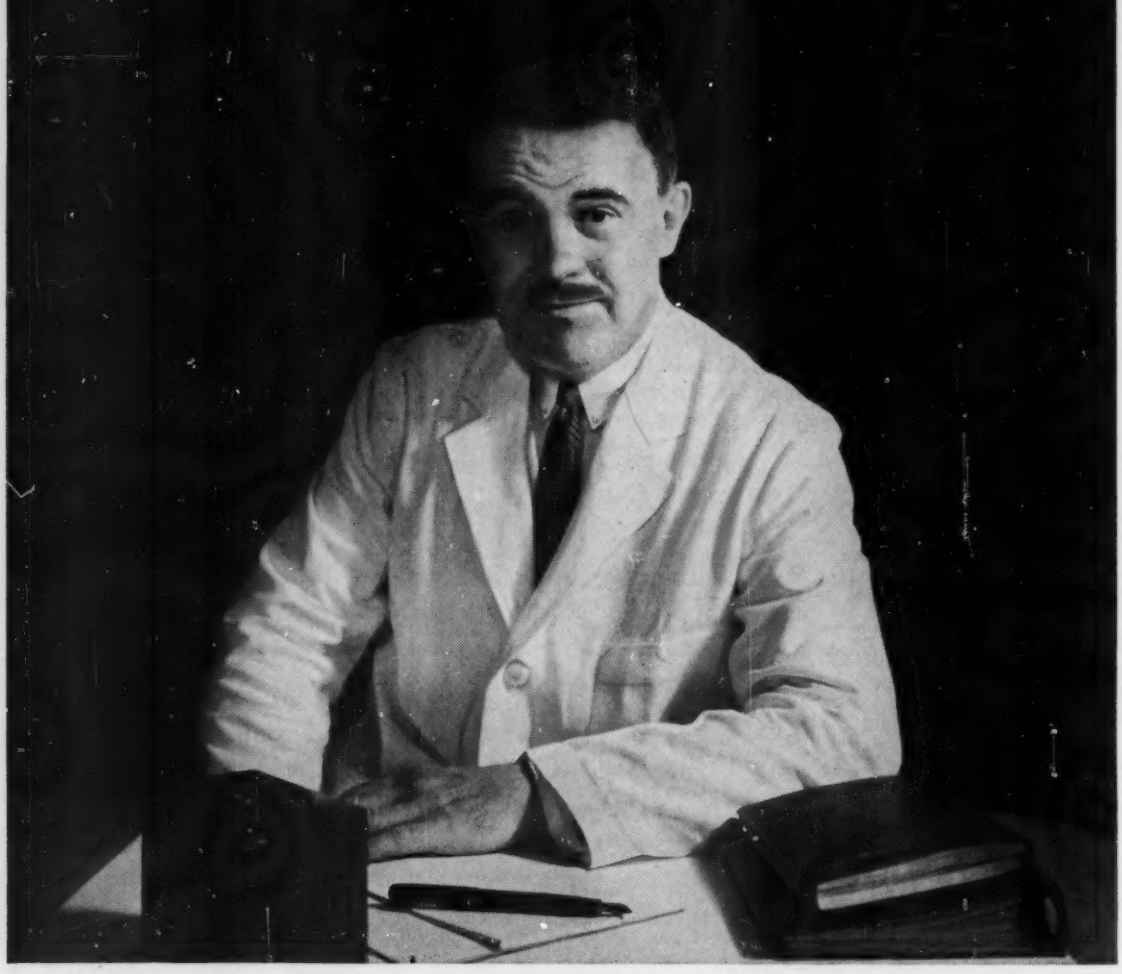

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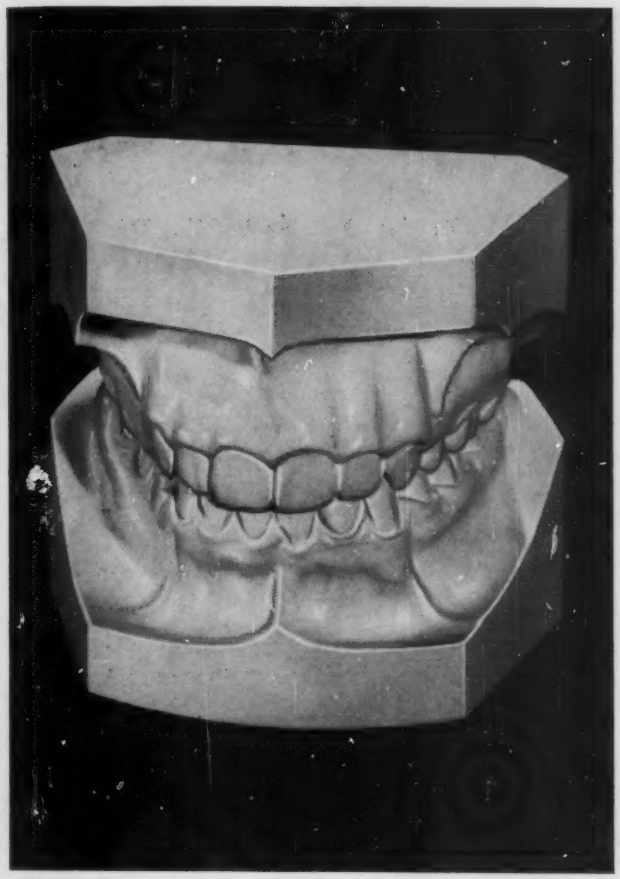

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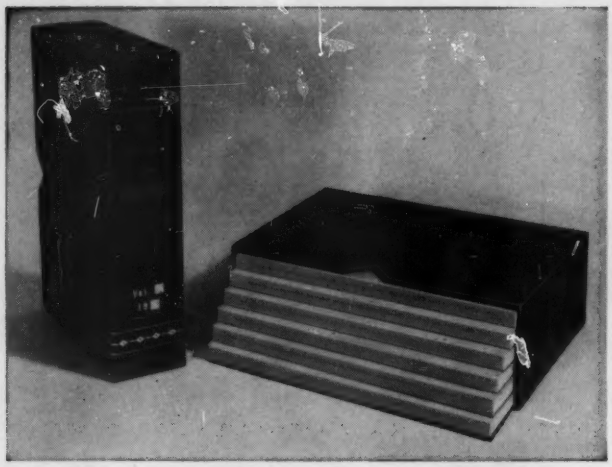

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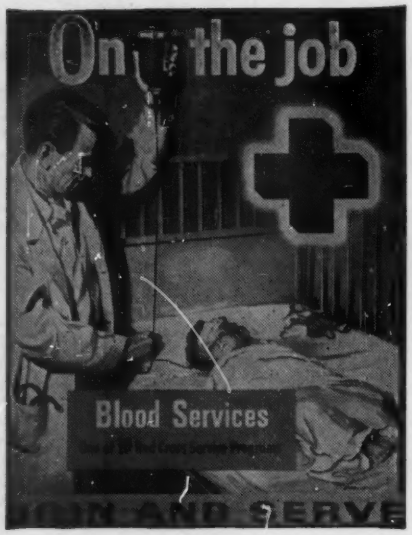

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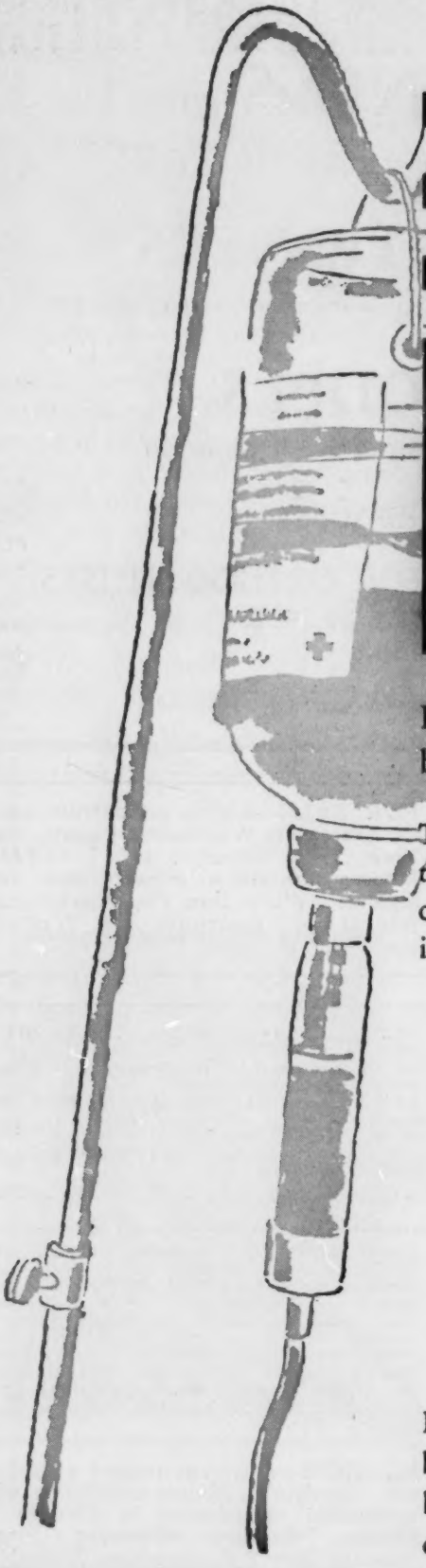

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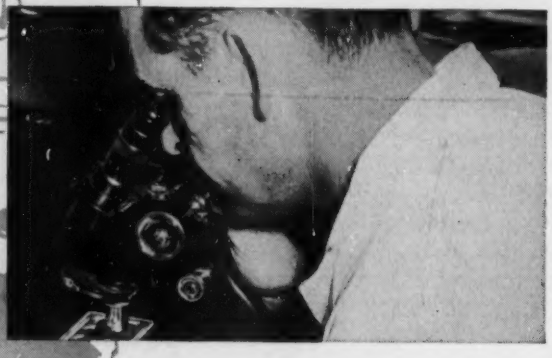

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The division of contents into two sections is retained as in earlier editions. The first section is restricted to pharmacology—and this has been broadened to include the many new drugs and preparations introduced since 1951, the date of the previous edition.

The second section, which is allocated to the study of dental and oral therapeutics, includes drugs, formulas, and prescriptions useful in dental practice. Each drug is discussed only once in detail and then, in addition and more specifically, under the various titles of therapeutic uses.

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